HARVARD SCHOOL OF PUBLIC HEALTH

Advancing the Public's Health Through Learning and Discovery

Official Register
of Harvard University
1999-2000

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Academic Calendar, 1999-2000

July 1-August 13	Summer Session for Public Health Studies (see page 82)
July 1-August 13	Summer Program in Clinical Effectiveness (see page 83)
August 17-28	English for Professional Communication (see page 83)
September 7-10	Strategies for Success: An Orientation Program for New Students (week one is optional; see page 83)
September 13-17	Strategies for Success, continued (week two is required for all new students)
September 13-14	Fall semester registration for new students and returning students
September 21	a and ab period courses begin
September 23	Last day for preregistered returning students to check in at Registrar's Office
October 11	Columbus Day, a holiday
October 28	Open house for prospective applicants
November 11	Veterans Day, a holiday
November 12	a period courses end
November 15	b period courses begin
November 25-28	Thanksgiving recess
December 15	Deadline for application to PhD programs in the natural sciences, offered through the Graduate School of Arts and Sciences (GSAS); deadline for application to other PhD programs offered through GSAS is December 30
December 22-January 2	Winter recess
January 3	Deadline for application to HSPH doctoral (SD and DPH) and Master of Science (SM) programs; deadline for application to Master of Public Health (MPH) and Master of Occupational Health (MOH) programs in priority admission cycle
January 17	Martin Luther King, Jr. Day, a holiday
January 21	ab and b period courses end
January 24-28	e period (optional special studies and field trips)
January 31	c and cd period courses begin
February 21	President's Day, a holiday
February 28	Final deadline for completing application to MPH and MOH
March 24	c period courses end
March 27-31	f period (optional special studies and field trips)
April 3	d period courses begin
May 1-5	Preregistration for continuing students for fall 2000
May 26	cd and d period courses end
May 29	Memorial Day, a holiday
June 8	Commencement

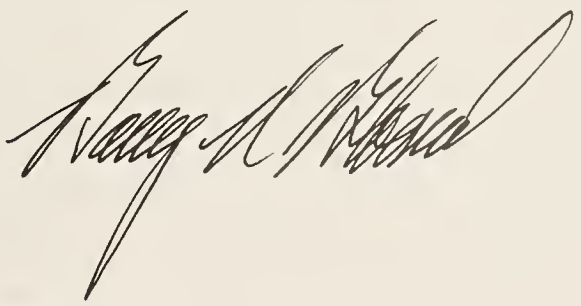
The twentieth century has seen history's greatest gains in life expectancy and quality of life. Increasing knowledge of public health is a major factor contributing to the extension of life expectancy in the US from 47 years in 1900 to almost 80 years by the end of this century. Yet there are major disparities in life expectancy, quality of life, and access to health in different parts of the world, and within this wealthy country. Some infectious diseases have or are being vanquished, but new ones emerge, such as AIDS and drug resistant infections. Violence, injuries, environmental and occupational factors, health financing and management, and much more, are within the purview and mandate of public health. The improvement of the health of populations demands diverse professional skills combined with the integration of varied disciplines.

To a new dean, HSPH is an extraordinary place. There are programs and projects ranging from the molecular biology of AIDS vaccines to the epidemiology of cancer; from risk analysis to violence prevention; from maternal and children's health to quality of care measurement; from health care management to international health and human rights. All are carried out with a palpable sense of dedication on the part of the faculty, students, and staff, and with a mutual respect for different ways of contributing to our shared purpose. The devotion of all to the educational program ensures that our students have a rewarding experience. I am also delighted with the students themselves, who are from diverse backgrounds and hold varied interests. Our students make the school a lively and stimulating place and keep all of us on our toes.

The courses, departments, centers, programs, and facilities described in the *Official Register* of the Harvard School of Public Health reflect the range and scope of the contemporary public health enterprise. The interests and expertise of faculty at the school are similarly diverse, extending across biological sciences, social sciences, numeric disciplines, and more. Scholars and professionals work together to overcome real-world public health challenges, including environmental hazards, new diseases, choices of lifestyle that rob individuals of many healthy years, inadequate access to health care, and the great parasitic diseases that kill and handicap millions around the globe. The school's multidisciplinary approach ensures that students gain both a broad perspective on public health and in-depth training in their field of interest.

This *Register* is an important source of information about educational opportunities at the Harvard School of Public Health. Though we have endeavored to make it accurate and comprehensive, it is necessarily an incomplete description of the learning experience available at the school. HSPH is a place to acquire new skills; a place to enrich one's professional perspective by interacting with fellow students, with HSPH faculty, and with scholars from cooperating schools and institutions; a place to gain a more sophisticated understanding of health sciences, health issues, and solutions to health problems; and a place to test one's ideals, objectives, and imagination against the imposing array of biological, behavioral, social, economic, and political barriers to improved public health. For those seeking more details on programs or departments, we have incorporated contact information throughout the *Register* and invite prospective students to call or write at any time.

The overarching mission of the Harvard School of Public Health is to advance the public's health through learning, discovery, and communication. Our objectives are to educate leaders, scientists, and professionals in public health; to create new discoveries and new ideas; and to develop new technologies for improving the health of individuals and populations. We hope to inform and influence debate on key public health issues and to strengthen capacities and services in our institutions to meet the health needs of our communities. We are engaged in an enterprise of vital importance to every individual and to society. We welcome those who join us in meeting these challenges and sharing in that sense of wonder and excitement that results from efforts to change the world of health and improve the health of the world.



Barry R. Bloom
Dean

The history of professional education in public health at Harvard University began in 1909 with the establishment of the Department of Preventive Medicine and Hygiene in the Medical School, the first such department in the United States. In 1919, the Harvard-MIT School of Health Officers was formed under the joint management of Harvard University and the Massachusetts Institute of Technology (MIT). The School of Health Officers operated until 1922, when an endowment from the Rockefeller Foundation made possible the founding of the Harvard School of Public Health (HSPH).

Faculty and graduates of HSPH have been at the forefront of efforts to stem disease and promote health worldwide: from Alice Hamilton's pioneering studies of lead and mercury poisoning to Thomas Weller's pathbreaking research on the polio virus, from Philip Drinker's invention of the iron lung to the unprecedented 27-year stewardship of the US Centers for Disease Control and Prevention (1962-1989) by five successive HSPH alumni. Three Nobel Prizes, a Lasker Prize, two MacArthur Awards, presidential citations, and countless other honors attest to the excellence and impact of this work. More difficult to quantify—but a far better gauge—are the perceptible gains in length and quality of life that have been realized through their efforts.

Today, HSPH includes over 300 faculty members from the diverse fields and disciplines that constitute public health. The student body comprises nearly 800 persons from throughout the United States and fifty other countries. Students, like faculty, come from an array of fields, and include health services administrators, epidemiologists, nurses, dentists, lawyers, statisticians, environmental scientists, engineers, research assistants, psychologists, and social workers. Approximately 30 percent are physicians. Students in some programs may enroll immediately after earning an undergraduate degree.

With the notable exception of the MPH program, most of the school's teaching and research activities are carried out in ten academic departments, which are described in some detail in this *Register*.

Degrees Offered by HSPH

HSPH offers programs leading to the graduate degrees of Master of Public Health (MPH), Master of Science (SM) in a public health discipline, Master of Occupational Health (MOH), Doctor of Public Health (DPH), and Doctor of Science (SD) in a public health discipline, as well as a part-time non-residential Master of Science in Health Care Management. The school also participates in Doctor of

Philosophy (PhD) programs offered through the university-wide Program in Health Policy (see page 54) and the Biological Sciences in Public Health Program (see page 12). Diplomas for the MPH, DPH, and MOH degrees show the degree only. Diplomas for the SM and SD degrees also show the name of the department; in the Department of Environmental Health a concentration is designated as well.

For all HSPH programs, the Committee on Admissions and Degrees considers applicants' academic ability, the relevance of their previous education and experience, and their overall qualifications for graduate education in public health, including those qualities of character that reflect upon an individual's suitability to be a public health professional. Applicants must also satisfy the requirements of the department or program to which they are applying. Applicants to doctoral programs must demonstrate the ability to undertake original research.

The master's degrees are considered terminal degrees for individuals who seek professional positions in public health, though a few departments view the SM as preparation for doctoral study. The doctoral programs are designed for students with interests in the scientific basis of public health and preventive medicine who wish to pursue academic or research careers. Because specific prerequisites and degree requirements vary with the field of specialization, prospective applicants should consult the sections of this *Register* that describe degree programs in greater detail and consult with the individuals designated as contact persons for the various departments and programs. In general, requirements for the HSPH degree programs are as follows.

Master of Public Health

The MPH program is geared toward professionals who hold a doctoral degree in medicine, dentistry, veterinary medicine, law, or other fields related to public health, or a master's degree in nursing. The MPH is normally a nine-month (two-semester, 40-credit) program. Summer-only matriculation is an option for students in the Clinical Effectiveness and Quantitative Methods concentrations. Students concentrate in one of seven areas: international health, health care management, family and community health, law and public health, occupational and environmental health, quantitative methods, or clinical effectiveness. Please see page 8 for further information about the program.

Master of Science

SM programs differ considerably from department to department. In general, eighteen-month (four-semester, 80-credit) SM programs are intended for applicants holding a bachelor's degree in a relevant field; some departments require or prefer applicants to have relevant work experience. A few departments also offer nine-month (two-semester, 40-credit) SM programs for applicants with a prior master's or doctoral degree or substantial work experience. Candidates for any SM degree must fulfill the school-wide requirements in biostatistics (BIO 200, BIO 201, or BIO 219) and epidemiology (EPI 200 or EPI 201), as well as any requirements of the department in which they are enrolled. Students in SM programs designated as professional degree programs (as opposed to research degrees) must fulfill core requirements in biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral sciences.

Master of Occupational Health

The MOH program is designed to train physicians in the public health disciplines relevant to preventing occupational disease and injury. This nine-month (two-semester, 40-credit) degree program is usually taken as part of a two-year residency in occupational medicine. Please see page 31 for information about the program.

Resources

The school's main buildings for research, teaching, and administration are located in the heart of Boston's hospital district and Harvard University's Longwood campus. The facilities adjoin those of Harvard's Medical School, School of Dental Medicine, and Francis A. Countway Library of Medicine, and are near Children's Hospital Medical Center, Beth Israel Deaconess Hospital, Brigham and Women's Hospital, and other Harvard affiliated hospitals. The school is within walking distance of many cultural institutions, such as Boston's Museum of Fine Arts, and public transportation is readily available to other parts of Boston and Cambridge, where students may cross-register for courses at other Harvard schools and at MIT.

The library needs of the school are served principally by the Francis A. Countway Library of Medicine, which combines the resources of the Harvard Medical Library and the Boston Medical Library. With recorded holdings of more than 800,000 volumes, 3,700 current periodicals, and extensive electronic databases, it is one of the largest medical or health-related libraries in the country. The Countway also owns an extensive collection of historical materials dating from the fifteenth century. Students have borrowing privileges throughout the Harvard University library system. The Boston Public Library, MIT libraries, and other Boston-area libraries add to the total book and periodical resources available to students.

HSPH operates an Instructional Computing Facility dedicated to serving the course work and research computing needs of its students and faculty. Resources include SUN Unix computers, X-terminals, IBM personal computers, Apple Macintosh computers, a Novell network, laser printers; a wide array of software, including statistical packages, programming languages, analytical programs, and word-processing packages; services such as remote dial-in, file transfer, electronic mail, connections to the Internet and World Wide Web, user assistance, short courses, and computer accounts for funded research. Many academic departments also provide computing resources for their students. Additional services, such as computer classes, discounted hardware and software, user groups, and technical support, are available through the offices of Harvard's University Information Systems.

Doctor of Science

Applicants to the SD program must hold a bachelor's degree. In some instances an applicant is expected to complete an SM program at the school before applying for admission to doctoral study. Candidates for the SD degree must adhere to the doctoral timetable for maintaining satisfactory progress and must fulfill the following basic requirements: completion of course work in one major field (20 credits) and two minor fields (10 credits each) and courses in introductory epidemiology (EPI 200 or EPI 201) and intermediate biostatistics (ordinarily BIO 210 and BIO 211); completion of the school-wide oral qualifying examination, usually by the end of the second year; completion of a program of independent and original research in one of the basic disciplines of public health; the presentation and submission of this research in a thesis and the public defense of the thesis; and payment of at least two years of full-time tuition and one year of full-time reduced tuition. The *Student Handbook*, distributed during fall registration, provides detailed information about school-wide requirements, timetables, and procedures. Departments may stipulate course and examination requirements beyond the school-wide requirements, and prospective applicants are encouraged to contact the department or program to which admission is sought for detailed information.

Doctor of Public Health

Most applicants for admission to the DPH program hold a doctoral degree in medicine, dental medicine, or veterinary medicine; consideration is also given to applicants who hold an advanced degree in one of the disciplines basic to public health. The applicant must hold, or be in progress toward, an MPH degree, or its equivalent, from an approved institution. Once admitted to the school, DPH candidates are subject to the same academic requirements as candidates for the SD degree, described above.

Institutes and Centers

The school has established several institutes and centers to advance research in areas of importance to health. These efforts tend to be multidisciplinary in their approach, bringing together faculty from several HSPH departments and, in some instances, from several Harvard schools. Faculty affiliated with the programs offer courses in their field of interest through the school's academic departments and often provide opportunities for student involvement in research.

Center for Biostatistics in AIDS Research
Executive Director: Kenneth Stanley, MA, PhD, Lecturer on Biostatistics
Scientific Director: Stephen Lagakos, MPhil, PhD, Professor of Biostatistics
For more information, contact Kenneth Stanley
Phone: 617-432-2822
Fax: 617-432-2843
E-mail: kstanley@sdac.harvard.edu

Center for Health Communication
Director: Jay A. Winsten, PhD, Associate Dean for Public and Community Affairs
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E-mail: tmendoza@sph.harvard.edu

Center for Quality of Care Research and Education (QCARE)
Director: R. Heather Palmer, MB, BCh, SM, Lecturer on Health Services
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Center for the Prevention of Cardiovascular Disease
Director: Jeffrey M. Leiden, MD, PhD, Elkan R. Blout Professor of Biological Sciences
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François-Xavier Bagnoud Center for Health and Human Rights
Director: Stephen P. Marks, Diplôme, PhD, François-Xavier Bagnoud Professor of Health and Human Rights
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www: www.hri.ca/partners/fxbcenter/

Harvard AIDS Institute
Chair: Myron E. Essex, DVM, PhD, John LaPorte Given Professor of Immunology and Infectious Disease
Executive Director: Richard Marlink, MD
For more information, contact
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Harvard Center for Cancer Prevention
Director: David J. Hunter, MB, BS, MPH, SD, Professor of Epidemiology
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Fax: 617-432-1722
E-mail: hccp@hsph.harvard.edu

Harvard Center for Children's Health
Director: Marie C. McCormick, MD, ScD, Sumner and Esther Feldberg Professor of Maternal and Child Health
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Harvard Center for Population and Development Studies
Acting Director: Sudhir Anand, DPhil, Adjunct Professor in the Department of Population and International Health
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www: www.hsph.harvard.edu/hcpds

Harvard Center for Risk Analysis
Director: John D. Graham, AM, PhD, Professor of Policy and Decision Sciences
For more information, contact Lynne Mastone
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Harvard Center for Society and Health
Director: Ichiro Kawachi, MD, PhD, Associate Professor of Health and Social Behavior
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E-mail: csh@hsph.harvard.edu

Harvard Education and Research Center for Occupational Safety and Health
Director: David C. Christiani, MD, SM, MPH, Professor of Occupational Medicine and Epidemiology
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Harvard Injury Control Research Center
Director: David Hemenway, PhD, Professor of Health Policy
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Phone: 617-432-2123
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www: www.hsph.harvard.edu/hicrc

John B. Little Center for Radiation Sciences and Environmental Health
Director: John B. Little, MD, James Stevens Simmons Professor of Radiobiology
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Phone: 617-432-0054
E-mail: uriedel@sph.harvard.edu

Kresge Center for Environmental Health
Director: Joseph D. Brain, SM, SM, SD, Cecil K. and Philip Drinker Professor of Environmental Physiology
For more information, contact Arlene Kirsch
Phone: 617-432-3483
E-mail: akirsch@sph.harvard.edu

For more information on the Division of Public Health Practice, or the Minority Postdoctoral Fellowship Program, please contact Renee Cutting, 1552 Tremont Street, Boston, MA 02115.
Phone: 617-432-0284
Fax: 617-432-0068
E-mail: rcutting@hsph.harvard.edu

For more information about the Interdisciplinary Program in Infectious Disease, contact Jonathan Freeman, MD, SD, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4558
Fax: 617-566-7805
E-mail: jfreeman@hsph.harvard.edu

For more information about research and training in Molecular Epidemiology, please contact Karl T. Kelsey, MD, MOH, Departments of Cancer Cell Biology and Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
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E-mail: kelsey@hohp.harvard.edu

Division of Public Health Practice

The Division of Public Health Practice serves as a conduit between the work of HSPH academic departments, governmental and corporate agencies, and the community. The mission of the division encompasses education, research, and service.

The division bridges gaps that have historically existed between schools of public health and the communities that they are intended to serve. The division provides community-based research and applied experiences for students. The division advances public health practice to better meet the leadership, programmatic, and public policy needs of populations at risk.

Included under the umbrella of the division are the Minority Postdoctoral Fellowship Program, the Office of Government and Community Programs, the Preventive Medicine Program, the Program for Health Care Negotiation and Conflict Resolution, the Program in Minority Health Policy Research and Disease Prevention, the Program on Social Inequality and Health, and the Violence Prevention Program.

Interdisciplinary Program in Infectious Disease

Education and research on aspects of infectious disease occur in a number of HSPH departments including the Departments of Environmental Health, Epidemiology, Immunology and Infectious Diseases, Nutrition, and Population and International Health. These departments participate in the Interdisciplinary Program in Infectious Disease, which focuses on population studies incorporating both epidemiologic and laboratory methods. This doctoral program is intended for those students who desire careers in research and teaching in infectious disease.

Prospective students must apply to one of the participating departments, and the degree will be issued from that department. Students are responsible for fulfilling the doctoral requirements of the home department in addition to the program's core requirements in biology, quantitative methods, and substantive infectious disease courses.

Alternatively, the Departments of Epidemiology, Immunology and Infectious Diseases, and Population and International Health offer discipline-oriented doctoral or master's degree programs. Please refer to the appropriate sections of this *Register* for descriptions of these discipline-centered degree programs.

Interdisciplinary Program in Molecular Epidemiology

Molecular epidemiology, which encompasses a novel approach to the study of disease occurrence, is a focus of attention in several of the school's departments. In the Department of Environmental Health, for example, ongoing research utilizes biomarkers of exposure and exposure-related disease, as well as gene-environment interaction. The Department of Epidemiology is conducting molecular research in disease mechanism, outcome, and susceptibility. Members of the Department of Biostatistics are developing novel methods for understanding molecular and genetic parameters governing disease occurrence. Finally, researchers in the Department of Nutrition are examining whether variation in enzymes that metabolize nutrients alter the relations of diet and disease.

Prospective doctoral students must apply to one of the participating departments, and the degree will be issued from that department. Students are responsible for completion of degree requirements of the home department in addition to the program's core requirements in biology, genetics, exposure assessment, and epidemiology.

For more information about courses related to women, gender, and health, contact Judianne Urmazu, 651 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0656
Fax: 617-566-4310
E-mail: jurmazu@hsph.harvard.edu

WGH 200c. Women, Gender, and Health (Krieger, Gruskin)

Focuses on constructions of gender and sex and their implications for understanding determinants of population health and creating healthy public policy. Demonstrates ways of conceptualizing gender in relation to biology and health using case examples pertaining to breast cancer, smoking, cumulative trauma disorders of the hands and wrists, HIV/AIDS, violence, access to health services, sexual health, reproductive health, and population policy. (2.5 credits)

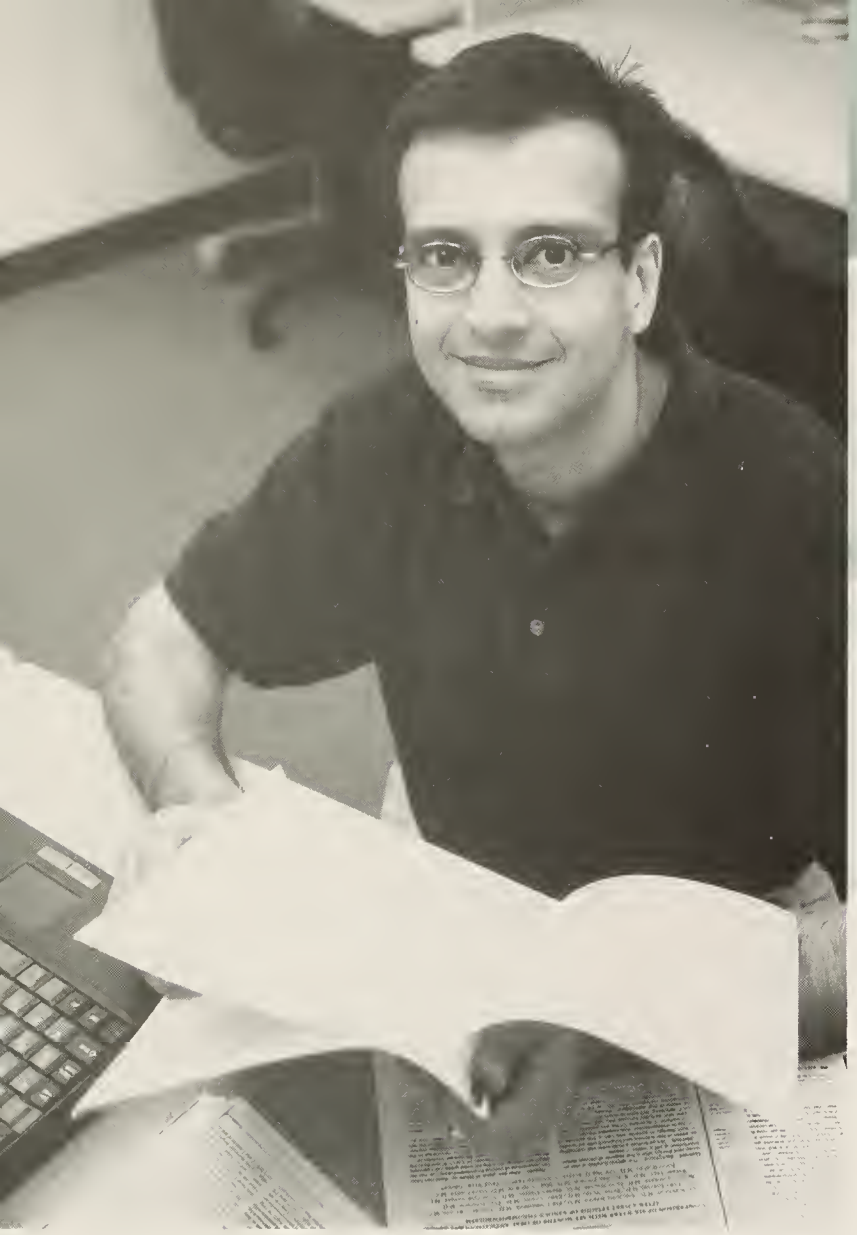
Minority Postdoctoral Fellowship Program

This program assists in the transition between academic training in public health disciplines and entry-level faculty positions for members of underrepresented minority groups. Each fellow works closely with a faculty mentor who helps foster the fellow's professional development in teaching and research. Fellows normally complete the program in two years, having established an independent research agenda, published papers in peer-reviewed journals, obtained independent grant support, and gained sufficient teaching experience to develop their own courses. Fellows also participate in other activities designed to involve them fully in the formal and informal life of the academic community.

Candidates for this program are American citizens or permanent residents belonging to one of the minority groups (African American, Hispanic/Latino, and Native American) considered to be underrepresented in the faculty ranks. All applicants must hold an earned doctoral degree in a field appropriate to their area of interest at HSPH. The fellowship carries a competitive stipend.

Women, Gender, and Health

Several departments offer courses designed to increase understanding of the health of girls and women throughout the life cycle, with gender and biology understood as determinants of health, disease, and well-being. Faculty members of the interdepartmental working group on women, gender, and health offer an interdepartmental course, and the group maintains a list of HSPH and non-HSPH courses that are relevant to women's health.



Alykhan Nanji
Master of Public Health Student

After receiving his MD, Alykhan "Aly" Nanji was doing his internal medicine residency in Calgary, Canada, when one of the hospitals closed. Budget cuts were forcing many Canadian hospitals to close, and Nanji yearned to do something about it.

"I enjoy practicing medicine in the Canadian environment, but I also recognize that universal health care isn't cheap. Furthermore, organizational problems can compromise an institute's potential and the quality of patient care," he says.

Nanji decided to broaden his training to include health care management. "Because Canada has a nonprofit health system, people think it lacks innovation," Nanji says, "but I disagree. Competition may create an atmosphere for change, but universal access to health care needn't prevent it." Nanji came to HSPH "to learn about competitive health care systems and how to apply that knowledge in Canada."

The Master of Public Health (MPH) degree is the most widely recognized professional credential for leadership in public health. The program is organized around seven career-oriented concentrations, each comprising a common core curriculum and specialty electives. The program emphasizes active, student-directed learning, problem-solving, and the acquisition of skills essential to the practice of public health.

MPH students come from all parts of the world, bringing to the program a wide variety of backgrounds and experiences. The majority are midcareer professionals preparing for advancement in their organizations or for transition into new fields. Most hold a professional degree in medicine, nursing, veterinary medicine, or law. Some hold a doctoral degree in a field related to public health, such as biology, behavioral sciences, or other natural and social sciences. On occasion, an individual is admitted to the program who holds a master's degree in a field closely related to public health and who has at least three years of relevant work experience.

Students enrolled in MD, DMD, or DDS programs (and some law students already holding an advanced degree) and who have a career interest in public health and/or preventive medicine are eligible to apply for admission to the MPH program. Generally, these students undertake the MPH program while on leave of absence between the third and fourth year of medical or dental school. They receive the MPH degree upon successful completion of both programs and conferral of the doctoral degree. Students at Harvard Medical School may wish to inquire about the possibility of undertaking an integrated MD-MPH program.

MPH candidates may complete the requirements for the degree on a full-time or part-time basis (or may change from one status to the other). Full-time students normally complete the program in two semesters (September through May). Part-time students complete the requirements for the degree over a period of two or three years. Students in the Quantitative Methods or Clinical Effectiveness concentrations may apply for the summer MPH which can be completed by taking courses in three consecutive enrollments in the Summer Session for Public Health Studies (see page 82). A maximum of 20 credits of coursework taken as a nondegree student can be transferred into a subsequent degree program. Students in the Summer Session are normally limited to 10 credits per summer; students in the Program in Clinical Effectiveness (see page 83) are limited to 15 credits per summer.

MPH students are required to complete a minimum of 40 course credits and must fulfill core requirements in the fundamental public health disciplines. These requirements include an interdisciplinary course on the ethical basis of the practice of public health (ID 250 or 251); the practice course for the chosen concentration (see course listings on page 11); one course in biostatistics (BIO 200 or 201); one course in epidemiology (EPI 200 or 201); one course in environmental health (usually EH 201or 202); one course in health and social behavior; and 2.5 to 5 credits in management courses relevant to the chosen concentration. Concentration guidelines are available from the MPH office.

Applicants to the MPH program select one of seven areas of concentration in which they complete a second tier of recommended courses. Each of these concentrations offers a selection of optional tracks, or interest areas, allowing students to pursue in depth one or more areas of particular relevance to their career goals. The tracks enable students in the interdisciplinary MPH program to establish a second "home" in one of the school's academic departments, such as Health Policy and Management or Maternal and Child Health. Beyond the program and concentration requirements, students are encouraged to consult with faculty advisors to choose elective courses best suited to their needs. Concentration goals, tracks, and general requirements are described below.

International Health This concentration is intended to prepare health professionals for leadership roles in the practice of international health, with a special emphasis on the health problems of populations in developing countries. The concentration enables students to work toward health improvement by taking account of demographic and epidemiologic changes, the organization of health care and evolving patterns of health care demand, new scientific knowledge and technology, and the roles of professionals in policy, law, communications, and advocacy. It also assists them in finding new ways to strengthen national and institutional capacities for health policy making and management. Graduates of the program have assumed leadership positions in national ministries of health, international organizations, donor aid agencies, private voluntary organizations, research and academic institutions, and the private sector.

The International Health concentration has no defined tracks. Students are encouraged to choose elective courses best suited to their professional development.

Health Care Management This concentration prepares professionals for leadership positions in health care organizations that provide direct care (such as hospitals, group practices, and home health agencies), those that pay for and/or organize health care (such as governments, health insurers, and health maintenance organizations), and those that supply direct-care providers (such as pharmaceutical companies and biotechnology firms). Course work covers the growing role of managed care in the health care enterprise. Program graduates fill many roles, from consultants and staff analysts, to middle management and executive positions.

Beyond the MPH core requirements, students choose between either a management or a policy (economics and political science) disciplinary approach to public health and select from clusters of recommended courses to gain depth in their chosen area.

Family and Community Health This concentration focuses on the promotion of health and the prevention of disease in populations by preparing health professionals with leadership skills in public health. Courses emphasize strategies for establishing health objectives, data collection and analysis, the management of fiscal and manpower resources, consultation, communication, advocacy, and policy formation in the public sector. The program prepares students for positions in diverse public health and nonprofit settings, including federal, state, and local government, voluntary health organizations, and community-based primary care settings. Positions filled by program graduates include public health administrator,

health planner, health policy analyst, and health educator; others have gone on to undertake doctoral study.

Beyond the MPH core requirements, students are encouraged to develop expertise in a substantive area geared to their professional interests. Areas of interest include maternal and child health, community health, financial analysis, mental health and substance abuse, women and health, and health promotion and disease prevention.

Law and Public Health This concentration is designed to train leaders in the field of public health law. The course of study introduces lawyers to the science of public health, provides them with skills in analysis of public health problems, and allows them to design a curriculum that will meet their particular interests. The concentration prepares graduates for positions in a variety of settings, including work in a health law or environmental section of a law firm, positions in local, state, and federal government, or posts in academia.

Beyond the MPH core requirements, lawyers are encouraged to develop a specialization in a substantive area by choosing among clusters of recommended courses in such fields as health care delivery or environmental health.

Occupational and Environmental Health This concentration is designed for physicians and other professionals who intend to practice occupational medicine or to hold responsible positions in occupational and/or environmental policy and management. The curriculum focuses on assessing workplace hazards, the physiologic and biomechanical aspects of work, and a practical problem-solving approach to health problems in various work settings.

The concentration features three areas of special interest: occupational medicine, occupational health, and environmental health. The occupational medicine track is designed for physicians who intend to satisfy the requirements of the American Board of Preventive Medicine for certification in occupational and environmental medicine. The requirements for the Master of Occupational Health (MOH) degree are similar to those of the MPH in occupational medicine; physicians may elect either degree. Please see page 31 for information about the MOH program.

This concentration also fulfills the first-year requirements of the two-year residency program in occupational and environmental medicine (see page 31 for more information on this program).

Quantitative Methods This concentration prepares students for public health careers in which quantitative methods are central. It is designed for midcareer health professionals and those in the early stages of their careers. The concentration emphasizes study design and data analysis, and the application of quantitative methods to decision making and to research in public health. Program graduates commonly supervise population-based health research in government, health care institutions, and private industry. Many graduates practice in academic medicine.

Beyond the MPH core requirements, concentrators must take an additional 2.5 credits of introductory epidemiology and 7.5 credits in intermediate/advanced biostatistics, epidemiology, or decision sciences and an approved *d* period practice course. Concentrators may choose from among advanced quantitative courses at HSPH or elsewhere in the university, including biostatistics, epidemiology, decision sciences, demography, needs assessment, and evaluation.

Clinical Effectiveness This concentration prepares physicians for clinical research responsibilities and for leadership roles in evaluating and improving all aspects of health care delivery. It is concerned with identifying the most appropriate, ethical, and cost-effective means of providing health care through prevention, early detection, or treatment, and is designed to provide the analytic and quantitative training necessary to evaluate clinical practices. Along with the broad perspective the program offers on general aspects of public health, this training provides a basis for identifying the health policy implications and public health benefits of the results of

clinical investigations. Major areas of professional interest for concentrators include clinical epidemiology and biostatistics, cost-effectiveness analysis, medical decision analysis, health services research, quality improvement in health care, and measurement of health-related quality of life. The concentration is limited to clinicians enrolled initially in the Summer Program in Clinical Effectiveness (see page 83).

Students wishing to apply for the summer MPH in Quantitative Methods or Clinical Effectiveness must observe the same admissions deadlines as all MPH degree applicants. See page 83 for contact information.

The MPH program serves as a required academic year for residency training in preventive medicine, aerospace medicine, or occupational and environmental medicine. Please see page 31 for information about the occupational and environmental medicine residency.

Practice Courses for Master of Public Health Students, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information. Descriptions of other core courses and electives for the MPH program are included in the course listings of the respective departments. A description of core requirements for each concentration is available from the MPH office.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

ID 250. Ethical Basis of the Practice of Public Health
ID 250a. (M. Roberts)
ID 250b. (M. Reich)
Provides a broad overview of the main philosophical and moral ideas that are used to resolve debates of public health policy. Helps students develop the capacity to analyze, criticize, evaluate, and construct policy-oriented arguments. (2.5 credits)

ID 251s. Ethical Basis of the Practice of Public Health: Health Care Delivery (T. Brennan)
Emphasizes US health care policy and modern medical ethics to explore the political theory of medical care. Helps health professionals understand the manner in which political economy and ethics interact in health care policy decisions. (2.5 credits)

ID 261cd. Practice of Health Care Management (J. Kasten)
Offered through two sections: one focuses on the managerial skills required of public health professionals, including leadership negotiations, interdisciplinary teams, and communication. The other section explores the policy-making process from a political perspective. Fieldwork for both sections provides practical experience in health care management or health policy development. (5 credits)

ID 262a. Introduction to the Practice of International Health (R. Cash)
Defines the scope of international health, highlights contemporary issues, and reviews case studies of policies and practices. Topics include world health and development, health transitions, disease control, primary health care, child survival, essential drugs, health policy, and evolving roles of international and nongovernmental organizations. (2.5 credits)

ID 263cd. Practice of Occupational Health (T. Smith, R. Herrick)
Focuses on the assessment of workplace hazards, the physiology and biomechanical aspects of work, and a practical problem-solving approach to health problems in various work settings. Emphasizes the relationship between working conditions and health, with special reference to the recognition, measurement, and control of occupational hazards. (5 credits)

ID 264bcd. Practice of Family and Community Health (I. Aitken, J. Kurland)
Enables students through fieldwork to apply managerial and analytic techniques to problems confronting public or community health agencies. (5 credits)

ID 265c. Practice of Quantitative Methods (R. Monson, M. Testa)
Explores practical and conceptual issues in the design, conduct, analysis, and evaluation of human studies through the discussion of current research and methodologies. Students design studies to address important health problems. (2.5 credits)

ID 330f. Field Trip (I. Aitken)
Gives students an overview of the activities of the Centers for Disease Control and Prevention (CDC) in Atlanta and an opportunity to meet individually with professional staff. Sessions address such disciplines as occupational diseases, surveillance systems, epidemiology, control measures for chronic and infectious diseases, and CDC's role in international health. (1 credit)

Program Director: Richard R. Monson, MD, SD, Associate Dean for Professional Education and Professor of Epidemiology

For more information about the MPH program or the summer MPH in Quantitative Methods or Clinical Effectiveness, please contact Roberta Gianfortoni, Director for Professional Education, Office for Professional Education, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0090
Fax: 617-432-3365
E-mail: rgianfor@hsph.harvard.edu
www: www.hsph.edu/mph

Kathy Sturm-Ramirez
Doctoral Student
Division of Biological Sciences

Kathy Sturm-Ramirez is curious about the ways epidemics spread through populations, consequently affecting societies and shaping history. Her interest stems from studies in Latin American history, particularly a smallpox epidemic that contributed to Spain's defeat of the Aztec empire, almost destroying the indigenous people there. Drawn to the study of infectious diseases in developing countries, Sturm-Ramirez's first research project took place in Mexico City, where she helped characterize and track amoebic infections among children residing in poor, urban areas.

Since coming to HSPH, Sturm-Ramirez has been studying the role of sexually transmitted diseases as risk factors for HIV infection in women. "There is a raging HIV epidemic in sub-Saharan Africa because of poverty, poor health care, and biological variation in the virus," she says. Following a population of 1,500 commercial sex workers in Senegal, Sturm-Ramirez is helping to elucidate biological factors that will contribute to solving population-based health problems.

The Division of Biological Sciences (DBS) is an umbrella organization encompassing the HSPH Departments of Cancer Cell Biology, Immunology and Infectious Diseases, Nutrition, and Environmental Health. In most of these departments, two doctoral degrees are offered: the Doctor of Philosophy (PhD) and the Doctor of Science (SD). In general, the PhD programs center on laboratory-based investigation in the biological sciences, while the SD programs emphasize epidemiological analysis.

Doctor of Philosophy in Biological Sciences in Public Health (BPH)

Students wishing to study cellular and molecular biology or physiology as it pertains to major problems in public health should apply to the PhD program in Biological Sciences in Public Health (BPH). This program offers the PhD degree through Harvard University's Graduate School of Arts and Sciences.

Participating HSPH departments offer PhD programs in the following areas:

- Cancer Cell Biology (Radiobiology; Toxicology)
- Environmental Health (Physiology)
- Immunology and Infectious Diseases (Immunology and Molecular Biology of Parasitic and Other Infections)
- Nutrition (Biochemistry; Cardiovascular Biology)

These programs are described in the departmental sections of this *Register*. In general, the BPH program offers a firm foundation in the basic biomedical sciences, as well as in epidemiology and biostatistics. Specific courses supplement this core, as dictated by individual research concentrations. Students in this program engage in laboratory rotations in three different research areas to enable them to assess realistically their interests in a thesis project and to evaluate the suitability of the laboratory and the mentor. At the completion of these rotations, students select an area of concentration and a thesis research laboratory and complete the required curriculum. A qualifying examination must be passed before engaging in thesis work, and the thesis must be defended before the granting of the PhD.

Applicants generally have a bachelor's degree and demonstrated competence in organic and biological chemistry, general biology, physics, and calculus. Those deficient in one of these areas may be admitted provisionally on the condition that appropriate courses will be taken before and/or after entering the program. Applicants must take both

the GRE general and subject tests by October in order to meet the application deadline of December 15, 1999.

All students admitted to the program receive a stipend, as well as tuition and health insurance support. Students are encouraged to apply for fellowships from outside sources since certain external fellowships provide higher stipends. While funds to support international students are limited, one special scholarship is available each year for a student from a developing, sub-Saharan African country. There is also a university-wide fellowship program that provides funding to qualified underrepresented minority students in the sciences.

Graduates ordinarily assume positions as faculty members and research scientists at medical schools, research institutes, and schools of public health. Career opportunities in the biological sciences as they apply to public health are expected to grow both in academia and in the biotechnology and pharmaceutical industries.

Courses Offered by the Division of Biological Sciences, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

DBS 201b. Interface of Biology and Public Health: Core Knowledge for the 21st Century (D. Wirth)
Examines the underlying biological mechanisms relevant to major public health problems. Emphasizes fundamental aspects of modern biological sciences, particularly those important for public health professionals and decision makers. This course is for all students who plan professional careers in public health. (2.5 credits)

DBS 205ab. Biological Sciences Seminars (M. Grusby, I. Ho)
Presents current research by faculty members in carcinogenesis, DNA damage and repair, immunology, molecular biology, radiobiology, respiratory biology, and virology. (5 credits)

DBB 207cd. Statistical Methods in Biology (S. Adak)
Familiarizes students with the statistical methods used in laboratory research for design of experiments and statistical analyses of hypotheses. Topics include theory of probability and statistics, analysis of data, ANOVA and multiple regression, and nonparametric methods. (5 credits)

DBE 208cd. Pathophysiology of Human Disease (L. Kobzik)
Surveys disease problems in the cardiovascular, respiratory, hematopoietic, reproductive, and gastrointestinal systems. Emphasizes the pathophysiology of disease manifestations, the pathogenesis of the disease process, and public health perspectives. (5 credits)

DBN 209d. Membrane Trafficking (M. Wessling-Resnick)
Presents a molecular overview of the elements involved in membrane traffic, describes how pathways are interconnected, and explains how regulatory mechanisms maintain cellular integrity through membrane traffic. (2.5 credits) Not offered 1999-2000.

DBS 211c. Thrombosis, Heart Attacks and Strokes: Molecular, Genetic, and Epidemiologic Insights (G. Reed)
Examines key epidemiologic, genetic, and molecular studies that link thrombosis and cardiovascular disease. Topics include the epidemiology of heart attacks and stroke, the molecular regulation of thrombosis, and the growing understanding of differential genetic risk for these events. Examples include the process of defining risk factors, discovering molecular mechanisms for causation, and translating those insights into better measures for the treatment or prevention of thrombotic disease. (2.5 credits)

DBS 212a. Molecular Basis of Vascular Biology: Gene Regulation and Its Application to Gene Therapy (L. Lee, M. Perrella, N. Sibinga, M. Chin, M. Russell)
Focuses on molecular regulation of genes important in blood vessel biology and development of vascular disease. Topics include regulation of genes for vascular development, angiogenesis, smooth muscle cell growth, and the maintenance of vascular tone/vascular reactivity. Gives special attention to the discovery of nodal regulatory genes that govern differentiation of vascular cells, use of transgenic and knockout models to elucidate gene function, and prospects for utility of gene therapy. (2.5 credits) Not offered 1999-2000.

DBS 231abcd. Interdisciplinary Seminar in Cardiovascular Disease Prevention (W. Willett, I. Kawachi)
Covers research in cardiovascular biology, epidemiology, health policy, and social behavior. (5 credits) Not offered 1999-2000.

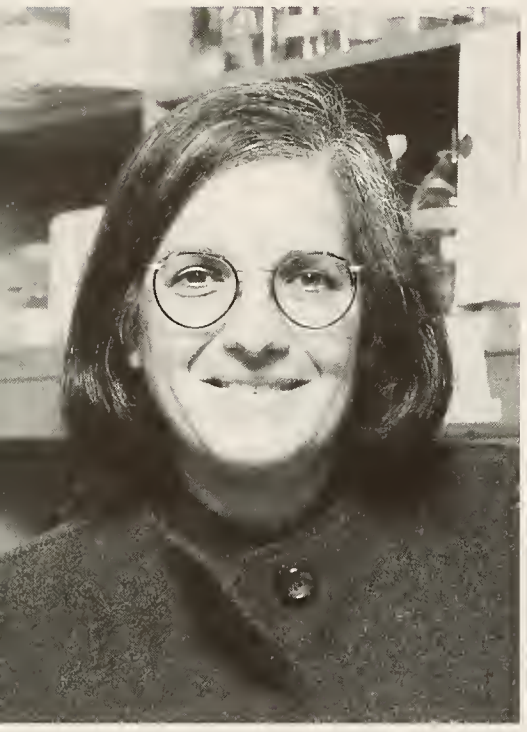
For application materials and information about admission to the PhD program, please contact the Graduate School of Arts and Sciences Admissions Office, Harvard University, 8 Garden Street, Cambridge, MA 02138.
Phone: 617-495-5315

The deadline for application to the PhD program is December 15.

Applicants who have specific questions about the PhD program may contact Ruth Kenworthy, Administrator, Division of Biological Sciences, 655 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4470
Fax: 617-430-0433
E-mail: kenworthy@cvlab.harvard.edu
www: www.hsph.harvard.edu/Academics/dbs/

For application materials and information about admission to the SD program, please contact Margaret Watson, Assistant Director of Admissions, Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1031
Fax: 617-432-2009
E-mail: admisofc@hsph.harvard.edu

The deadline for application to the SD program is January 3, 2000



Program Director, Committee on Biological Sciences in Public Health: Dyann F. Wirth, PhD, Professor of Tropical Public Health.

DBS Elective Courses

The Division of Biological Sciences offers interdisciplinary training, with students taking courses in several different departments to meet their individual requirements. All students complete core course requirements and elective courses during their first two years of study. In addition to core courses in biochemistry, cell biology, genetics, microbiology, and physiology, students take one or more of the following elective courses, which are described in the departmental listings of this Official Register.

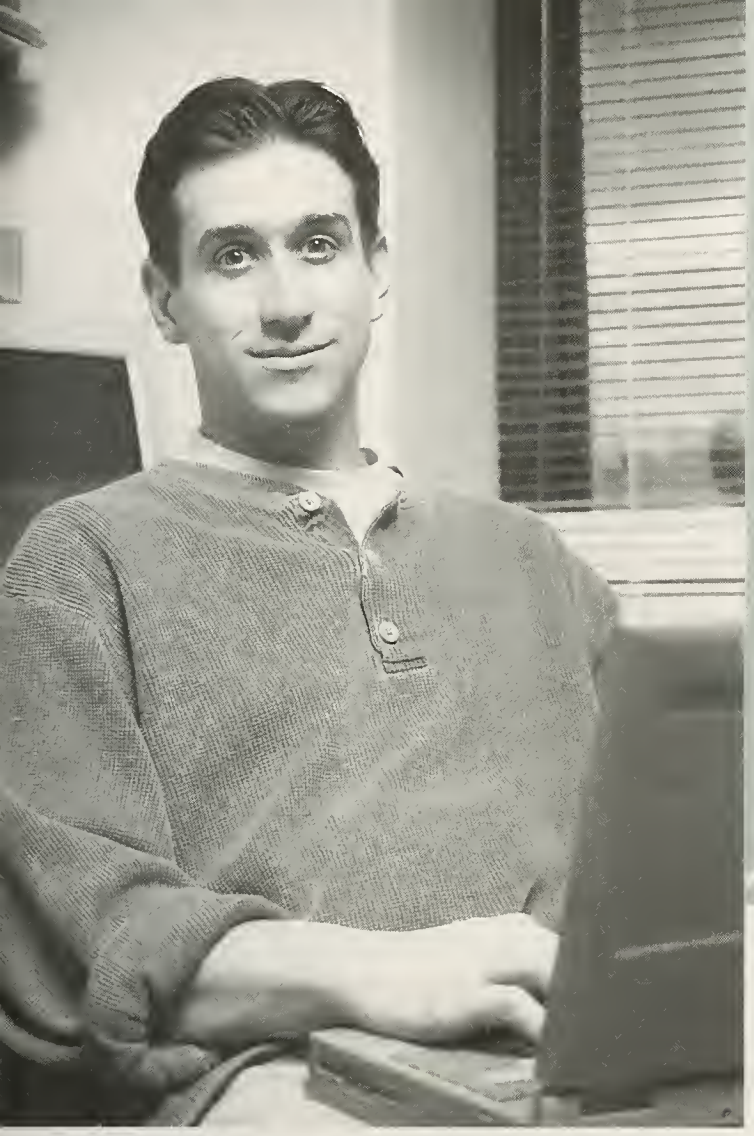
CCB 204	Principles of Toxicology
CCB 207	Introduction to Cancer Biology: Radiation Biology
CCB 210	Introduction to Cancer Biology
CCB 225	Genetic Toxicology
CCB 250	Molecular and Cellular Toxicology
EH 205	Human Physiology
EH 223	Advanced Respiratory Physiology
EH 225	Advanced Topics in Physiology
IMI 204	Survey of Immunobiology
IMI 208	Immunology of Infectious Diseases
IMI 216	Cellular and Molecular Biology of Parasites
NUT 202	The Science of Human Nutrition

Independent Study, Laboratory Rotations
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or to undertake specialized readings or studies. Offers hands-on experimental methods of research in the biological sciences and includes individual original laboratory work, assigned readings, and participation in seminars and journal clubs.

Core Mentoring Faculty
Robert B. Banzett
Barry R. Bloom
Joseph D. Brain
Harriet A. Burge
Barbara Burleigh
Hannia N. Campos
David C. Christiani
John R. David
Bruce F. Demple
Claire M. Doerschuk
Myron E. (Max) Essex
Timothy E. Ford
Jeffrey J. Fredberg
Laurie H. Glimcher
Beatriz S. González-Flecha
Michael J. Grusby
Donald A. Harn, Jr.
I-Cheng Ho
Gökhan S. Hotamisligil
Phyllis J. Kanki
Karl T. Kelsey
Lester Kobzik
Igor Kramnik
(Arthur) Mu-En Lee
Tun-Hou Lee
Jeffrey M. Leiden
John B. Little
Carl G. Maki
Joseph P. Mizgerd
Joseph D. Paulauskis
Mark A. Perrella
Karen E. Peterson
Willy F. Piessens
Guy L. Reed
Frank M. Sacks
Leona D. Samson
John C. Samuelson
Robert H. Schiestl
Steven A. Shea
Stephanie A. Shore
Joseph G. Sodroski
Armen H. Tashjian, Jr.
Ning Wang
Marianne Wessling-Resnick
Walter C. Willett
Dyann F. Wirth
Dieter A. Wolf
Xiping Xu
Zhi-Min Yuan

Adjunct Faculty
Howard L. Liber
Mary E. Russell
Robert Schlegel

Associated Faculty
Alberto B. Ascherio
Marla J. Berry
James P. Butler
Harold A. Chapman, Jr.
Jack T. Dennerlein
Douglas W. Dockery
Jeffrey M. Drazen
Ellen A. Eisen
Alan Eschenroeder
John S. Evans
Wafaie W. Fawzi
Edward L. Giovannucci
John J. Godleski
Diane R. Gold
Peter Goldman
Rose H. Goldman
Donald A. Goldmann
Joseph J. Harrington
Russ B. Hauser
Robert F. Herrick
Martin S. Hirsch
Howard Hu
Jouni J.K. Jaakkola
Stephen N. Kales
Rokho Kim
Petros Koutrakis
Clifford W. Lo
Nancy Long-Sieber
Stephen H. Loring
James H. Maguire
Kenneth H. Mayer
Kenneth McIntosh
Donald K. Milton
Thomas P. Monath
Richard R. Monson
Lucas M. Neas
Peter Ofner
Robert B. Pojasek
Lorenz R. Rhomberg
Eric B. Rimm
John J. Rogus
Stephen N. Rudnick
P. Barry Ryan
Joel D. Schwartz
Jacob Shapiro
Victor Cheng-Wei Shi
James P. Shine
Charles B. Shoemaker
Thomas J. Smith
Stover H. Snook
Wiley W. Souba
Frank E. Speizer
John D. Spengler
Andrew Spielman
Meir J. Stampfer
Helen H. Suh
Yuji Tanaka
George P. Topulos
Peter A. Valberg
Richard L. Verrier
W. Allan Walker
Angeline E. Warner
David H. Wegman
Scott Weiss
Yukio Yanagisawa



Chris Corcoran
Doctoral Student
Department of Biostatistics

Chris Corcoran conducts research in computational methods for exact nonparametric statistical analysis. "Computing power is increasing dramatically over time," says Corcoran. "Likewise, statistical tools must evolve to take advantage of this added power. With modern computing, we can carry out a greater number of statistical tests in health research without the risk of a false positive result." Corcoran says the department places high priority on providing and supporting up-to-date hardware and software.

He appreciates the fact that biostatistics students come from a variety of scientific and employment backgrounds. "Biostatistics allows you to take whatever prior training you have and contribute your knowledge meaningfully to solving important health research problems," he says. In the future, he would like to continue applying his statistical knowledge to public health: "In many ways, I believe that biostatistical science helps to quantify how we may live every day to maximize our health and well-being."

Faculty in the Department of Biostatistics contribute to the theory and practice of statistical science as it is applied to the biomedical and health sciences. The department prepares students for careers in the fields of biostatistics and health decision sciences.

The programs offered by the Department of Biostatistics provide rigorous training in the development of methodology, collaboration, teaching, and consultation on a broad spectrum of health-related problems. The faculty includes leaders in the development of statistical methods for clinical trials and observational studies, studies on the environment, animal experiments, and longitudinal studies. Members of the department participate in large multidisciplinary projects and serve on many national and international advisory committees. The department's research in statistical methods and its interdisciplinary collaborations provide many opportunities for student participation.

Current departmental research includes the development of statistical and computing methods for clinical trials, including survival and sequential analysis methodology; environmental and epidemiologic research, including methods for longitudinal studies, analyses with incomplete data, and meta-analysis; statistical aspects of the study of AIDS and cancer; collaborative clinical research in the treatment of cancer and AIDS; quantitative problems in health risk analysis, technology assessment, and clinical decision making; statistical methodology in psychiatric research and in genetic studies; and collaborative research activities with biomedical scientists in other departments at HSPH, Harvard Medical School, and affiliated hospitals.

Applicants to the department should have successfully completed calculus through multivariable integration and at least one semester of linear algebra, and have knowledge of a programming language such as FORTRAN or C. In addition, applicants are strongly encouraged to have courses in probability, statistics, and advanced calculus. Additionally, practical knowledge of a statistical computing package such as SAS, SPSS, S-PLUS or Stata is desirable.

Funding is available to qualified students pursuing the doctoral degree. Most of the funding is through five biostatistics training grants in AIDS, cancer, the environment, mental health, and public health training for underrepresented minorities. These traineeships

For more information about research and training in Biostatistics, please contact Ellen Fredberg, Administrator, Department of Biostatistics, 655 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1056
Fax: 617-739-1781
E-mail: dept@hsph.harvard.edu
www: www.biostat.harvard.edu

For more information about research and training in Health Decision Sciences, please contact Milton C. Weinstein, PhD, Department of Health Policy and Management, 718 Huntington Avenue, Boston, MA 02115
Phone: 617-432-0805
E-mail: mcw@hsph.harvard.edu

The Department of Biostatistics offers postdoctoral fellowships for biostatistical training in the areas of AIDS, cancer, environmental health, and mental health. These postdoctoral fellowships, funded by the National Institute of Mental Health or the National Institutes of Health, may be awarded only to US citizens or permanent residents. Candidates for postdoctoral fellowships must have a doctoral degree in biostatistics, statistics, or a related discipline. For more information, please contact the Chair of the Postdoctoral Committee, Department of Biostatistics, 655 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1056
Fax: 617-739-1781
E-mail: dept@hsph.harvard.edu

require US citizenship or permanent residency. Other limited funding is awarded on a competitive basis to qualified applicants.

Recent graduates have assumed faculty posts at universities and schools of public health, as well as positions in research laboratories and centers in the federal government, in pharmaceutical companies, and in research institutes.

As described below, the department offers both a four-semester and a two-semester Master of Science (SM) program and a Doctor of Science (SD) program with a concentration in Biostatistics, as well as a four-semester SM program and an SD program with a concentration in Health Decision Sciences. For information about the Master of Public Health concentration in Quantitative Methods, please refer to page 10. Detailed information about requirements and elective options can be found in a handbook distributed by the department.

Master of Science in Biostatistics (four-semester program)

Biostatistics The main purpose of the four-semester SM program with a concentration in Biostatistics is to prepare students for doctoral study, although a limited number of qualified students may pursue the master's degree only.

Of the 80 credits necessary to earn the four-semester SM, 2.5 credits must be used to fulfill the school-wide epidemiology requirement (EPI 200 or EPI 201), and 25 credits must be earned in the following core courses: BIO 230, *Probability Theory and Applications*; BIO 231, *Statistical Inference I*; BIO 232, *Methods I*; BIO 233, *Methods II*; and BIO 235, *Regression and Analysis of Variance*. An additional 15 credits must be chosen from biostatistics and epidemiology courses at the level of BIO 210 or higher (but below 300), of which 10 credits must be chosen from a specific list of biostatistics, health policy and management, and interdisciplinary offerings. In addition to formal course work, students acquire experience in the planning of experiments and the analysis of data by participating in a consulting seminar. Students also choose from a variety of elective courses.

Health Decision Sciences The concentration in Health Decision Sciences offers integrated educational training in decision sciences within the context of health problems. The program is jointly offered by the Departments of Biostatistics and Health Policy and Management. All students must be admitted to the master's program in one department or the other, and degrees are offered through one department or the other.

Of the 80 credits necessary to earn the SM, 2.5 credits must be used to fulfill the school-wide epidemiology requirement (EPI 200 or EPI 201), and students must complete the following core courses: HPB 280, *Decision Analysis for Health and Medical Practices*, or HPM 286, *Decision Analysis in Clinical Research*; HPB 281, *Methods for Decision Analysis in Health Care Technology Assessment*; HPE 284, *Decision Theory*; HPM 287, *Research Seminar on Risk and Decision Analysis*; HPM 288, *Management Science*; HPM 289, *Practicum in Decision Analysis and Cost Effectiveness*; BIO 230, *Probability Theory and Applications*; BIO 231, *Statistical Inference I*; and preparation in computing. Ten additional credits must be earned from the Health Decision Sciences core and extended core (see list under SD program), along with at least 10 additional credits in biostatistics. The consulting requirement may be met by obtaining practical experience under the tutelage of a faculty member. Students also choose from a variety of elective courses.

Master of Science in Biostatistics (two-semester program)

Like the four-semester SM program, the main emphasis of the two-semester program with a concentration in Biostatistics is the preparation of students for doctoral study. The program is designed for students who have a master's degree in one of the mathematical sciences or a doctorate in a quantitative field. Applicants must have a mathematical and statistical background sufficient to

achieve a level of proficiency after one year of study comparable to that achieved in the four-semester program. Since completion of the program in one year requires that courses be taken out of sequence, considerable background in probability and statistical inference is needed.

The requirements for the two-semester SM are essentially the same as for the four-semester program. The 25-credit core must be completed, although students who have taken equivalent course work elsewhere may petition to substitute more advanced courses. Greater flexibility is allowed in the other requirements, since only 40 total credits are required. Other courses are selected in consultation with a faculty advisor to complement and extend the student's previous training in biostatistics.

The department does not offer a two-semester program in Health Decision Sciences.

Doctor of Science in Biostatistics

Biostatistics The doctoral concentration in Biostatistics is designed for those who have demonstrated both interest and ability in scholarly research. Qualified applicants may apply directly to the doctoral program without a prior advanced degree. Candidates must complete a minimum of two academic years of full-time study in residence at HSPH, pass the written departmental comprehensive examination and the school-wide oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and complete, defend, and submit a thesis.

Beyond the school-wide requirement of introductory epidemiology (EPI 200 or EPI 201), the course work for the program is built on a 30-credit core curriculum which includes BIO 230, *Probability Theory and Applications*; BIO 231, *Statistical Inference I*; BIO 232, *Methods I*; BIO 233, *Methods II*; BIO 235, *Regression and Analysis of Variance*; and BIO 251, *Statistical Inference II*. In addition, 25 credits of biostatistics courses at the 230 level or higher (but below 300) are required; these courses are chosen by the student in consultation with an advisor. Students must also complete two minors (10 credits each), only one of which may be quantitative (such as theoretical statistics, biomedical computing, or health decision sciences) while the other must be substantive (such as the biology of cancer or AIDS).

Doctoral students are required to participate as a teaching assistant in a course offered by the department. In order to acquire experience in the planning of experiments and the analysis of data, students must take the consulting seminar.

Health Decision Sciences The doctoral concentration in Health Decision Sciences offers integrated educational training in decision analysis, cost-benefit and cost-effectiveness analysis, behavioral decision theory, operations research, applied welfare economics, statistical inference, computer science, and biostatistics, all within the context of health problems. This program is coordinated with, but distinct from, the decision sciences track in the PhD Program in Health Policy, described under Health Policy and Management (see page 54).

Candidates must complete a minimum of two academic years of full-time study in residence at HSPH, pass the written departmental comprehensive examination and the school-wide oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and complete, defend, and submit a thesis. The program requires 45 credits of course work in the major field, plus 10 credits in each of two minor fields, one of which must be biostatistics. Health policy and management is acceptable for the other minor, provided the courses focus on subject-oriented rather than quantitative material.

The course work includes the school-wide requirement of introductory epidemiology (EPI 200 or EPI 201); BIO 230, *Probability Theory and Applications*; BIO 231, *Statistical Inference I*; 20 credits from the Health Decision Sciences core; and 20 credits from the extended core. The core includes the following courses: HPB 280, *Decision Analysis for Health and Medical Practices*; HPB 281, *Methods for Decision Analysis in Health*

Faculty

Department Chair: Stephen W. Lagakos, MPhil, PhD (George Washington University); Henry Pickering Walcott Professor of Biostatistics and Scientific Director of the Center for Biostatistics in AIDS Research. Statistical methods arising in AIDS research; clinical trials.

Sudeshna Adak, MS (Indian Statistical Institute), PhD (Stanford University); Assistant Professor of Biostatistics. Spectral analysis of nonstationary time series; time-varying ARMA modeling; generalized linear models.

Rebecca A. Betensky, PhD (Stanford University); Associate Professor of Biostatistics. Sequential analysis; correlated binary data.

Paul J. Catalano, SD (Harvard University); Associate Professor of Biostatistics. Repeated measures; multivariate models; dose-response modeling; risk assessment; environmental statistics.

Victor G. De Gruttola, SM, SM, SD (Harvard University); Professor of Biostatistics. Methods for analysis of repeated measures from longitudinal studies; methods for epidemiological analysis of AIDS.

Garrett Fitzmaurice, MSc (University of London), MA (National University of Ireland), SD (Harvard University); Associate Professor of Biostatistics. Likelihood-based and non-likelihood approaches to analyzing multivariate binary outcomes; methods for analyzing mixed discrete and continuous outcomes.

Peter B. Gilbert, MS, PhD (University of Washington); Assistant Professor of Biostatistics. Statistical methods for HIV and AIDS; survival analysis; efficient estimation in semiparametric models; multinomial logistic regression models; biased sampling models.

Robert J. Gray, SM, PhD (Oregon State University); Senior Lecturer on Biostatistics. Clinical trials; survival analysis; techniques for exploratory data analysis and model building.

David P. Harrington, AM, PhD (University of Maryland); Professor of Biostatistics. Nonparametric methods for censored data; sequential designs for clinical trials.

Wenzheng Huang, ME, PhD (Johns Hopkins University); Assistant Professor of Biostatistics. Generalized linear models and survival analysis.

Michael D. Hughes, MSc, PhD (University of London); Associate Professor of Biostatistics. Statistical methods in the design, analysis, and reporting of clinical trials and overviews.

Joseph G. Ibrahim, MS, PhD (University of Minnesota); Associate Professor of Biostatistics. Generalized linear models; Bayesian inferences.

Neil S. Klar, MSc, MMath (University of Waterloo), PhD (University of Western Ontario); Assistant Professor of Biostatistics. Clinical trials and the analysis of correlated binary outcome data.

Nan M. Laird, PhD (Harvard University); Professor of Biostatistics. Longitudinal studies; nonresponse and missing data methods; discrete data analysis; Bayesian methods; meta-analysis.

Kathryn L. Lunetta, MS, PhD (University of Michigan); Assistant Professor of Biostatistics. Statistical issues in human genetics and methodology for mapping genetic markers.

Donna S. Neuberg, MA (University of Chicago), MA (State University of New York at Stony Brook), SD (Harvard University); Senior Lecturer on Biostatistics. Cancer clinical trials; genetic epidemiology.

Marcello Pagano, SM (University of Florida), PhD (Johns Hopkins University); Professor of Statistical Computing. Statistical computing; clinical trials; epidemic modeling.

Donna K. Pauler, MS, PhD (Carnegie Mellon University); Assistant Professor of Biostatistics. Development of models for the analysis of messy data arising from clinical trials.

James M. Robins, MD (Washington University); Professor of Epidemiology and Biostatistics. Development of analytic methods for drawing causal inferences from complex observational and randomized studies with time-varying exposures or treatments.

John J. Rogus, SD (Harvard University); Assistant Professor of Population Genetics (Environmental Health and Biostatistics). Development of statistical methods to localize genes for common, genetically complex diseases such as asthma, hypertension, and diabetic neuropathy; development of resampling methods to accommodate highly correlated genomic data.

Interdisciplinary Program in Molecular Epidemiology

A doctoral program is available in this department through the Interdisciplinary Program in Molecular Epidemiology. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, genetics, exposure assessment, and epidemiology. For more information on this program, see page 6.

Care Technology Assessment; HPB 282, *Cost-Effectiveness and Cost-Benefit Analysis in Public Health and Medicine*; HPM 287, *Research Seminar on Risk and Decision Analysis*; HPM 288, *Management Science*; HPM 289, *Practicum in Decision Analysis and Cost-Effectiveness*; and HPE 284, *Decision Theory*. For a list of extended core options, see the department's student handbook.

All doctoral students are required to participate as a teaching assistant in a course offered by the department. In order to acquire experience in decision analysis, students must take the consulting seminar or complete an outside project approved by the seminar director.

Courses Offered by the Department of Biostatistics, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information. Either BIO 200 or BIO 201 satisfies the school-wide requirement for an introductory course in biostatistics; however, individual programs may require one or the other.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

BIO 112a. Computing Principles and Methods (M. Pagano, E. Allred)
Provides basic computer literacy to students from all disciplines. Topics include computer architecture and terminology; E-mail and the World Wide Web; and a variety of Windows-environment packages including word processing, graphics, statistical analysis, spreadsheets, and data management programs. (2.5 credits)

BIO 113. Introduction to SAS
BIO 113b.(M. Pagano, E. Allred) (2.5 credits)
BIO 113e.(M. Pagano, T. Fenton) (1.25 credits)
BIO 113t. (M. Pagano, E. Allred) (2.5 credits)
Provides instruction in the use of SAS to prepare data for statistical analysis. The focus is on database management and programming problems. Discusses basic issues in each of these areas in the context of teaching specific skills required to use SAS effectively.

BIO 200ab. Principles of Biostatistics (M. Pagano)
Acquaints students with the basic concepts of biostatistics and their applications and interpretation. Topics include descriptive statistics, graphics, diagnostic tests, probability distributions, inference, tests of significance, association, linear and logistic regression, life tables, and survival analysis. (5 credits)

BIO 200s. Principles of Biostatistics I (M. Testa)
Presents the first part of introductory biostatistics, covering data presentation, numerical summary measures, rates and standardization, life tables, and sampling distributions. Introduces probability to quantify uncertainty. (2.5 credits)

BIO 200t. Principles of Biostatistics II (P. Catalano)
Presents the second part of introductory biostatistics, exploring inference in greater depth and emphasizing data analysis. Other topics include comparison of two means, analysis of variance, nonparametric methods, inference on proportions, contingency tables, multiple 2X2 tables, correlation, simple regression, multiple and logistic regression, analysis of survival data, and sampling theory. (2.5 credits)

BIO 201ab. Introduction to Statistical Methods (K. Gauvreau)
Covers basic statistical techniques for analyzing data from epidemiology, environmental health, and biomedical and other relevant research. Topics include descriptive statistics, probability, estimation and hypothesis testing, nonparametric methods, techniques for categorized data, regression analysis, analysis of variance, and study design. Designed as an alternative to BIO 200 for students desiring an emphasis on theoretical developments, or for those having had an introductory statistics course at the level of BIO 200. (5 credits)

BIO 206st. Statistical Principles in Medical Research (E. Orav)
Includes concepts in probability and statistics, hypothesis testing, nonparametrics, discrete data analysis, regression, and analysis of variance. Emphasizes the design and analysis of clinical studies. Designed primarily for participants in the Program in Clinical Effectiveness. (5 credits)

BIO 210cd. The Analysis of Rates and Proportions (N. Klar, N. Laird)
Emphasizes concepts and methods for analysis of data that are categorical, rate-of-occurrence, and time-to-event. Stresses applications in epidemiology, clinical trials, and other public health research. Topics include measures of association, 2X2 tables, stratification, matched pairs, logistic regression, model building, analysis of rates, and survival data analysis using proportional hazard models. (5 credits)

BIO 211cd. Regression and Analysis of Variance in Experimental Research (A. Rotnitzky)
Covers analysis of variance and regression, including details of data-analytic techniques and implications for study design. Also included are probability models, computing, and the formulation of scientific questions in terms of statistical models. (5 credits)

BIO 212cd. Survey Research Methods in Community Health (T. Mangione)
Covers research design, sample selection, questionnaire construction, interviewing techniques, reduction and interpretation of data, and related facets of population survey investigations. Focuses on applying survey methods to problems of health program planning and evaluation. (2.5 credits)

BIO 213ab. Applied Regression for Clinical Research (E. Orav)
Introduces students involved with clinical research to the practical application of multiple regression analysis. Covers linear regression, logistic regression, and proportional hazards survival models, as well as general concepts in model selection, goodness of fit, testing procedures, and an introduction to underlying likelihood theory. (5 credits)

BIO 214. Principles of Clinical Trials
BIO 214c. (L-J. Wei)
BIO 214t. (K. Stanley, R. Gelber)
Covers types of clinical research, study design, treatment allocation, randomization and stratification, quality control, sample size requirements, patient consent, and interpretation of results. Focuses on the scientific, policy, and management aspects of clinical trials. (2.5 credits)

BIO 217t. Linear Regression and Longitudinal Analysis
Introduces multiple linear regression and linear models for longitudinal data. Explains the concepts and statistical principles underlying linear regression analysis, describes methods for multiple regression analysis, and introduces the use of linear models in the analysis of longitudinal data. (2.5 credits) Not offered 1999-2000.

BIO 219ab. Statistical Methods for Health Policy and Management (M. Testa)
Introduces probability and statistics, with emphasis on their application to health care research contexts. Topics include descriptive statistics, probability and probability distributions, sampling distributions, experimental design and sampling methods, confidence intervals, hypothesis testing and p-values, nonparametric methods, and an introduction to sample linear regression. (5 credits)

BIO 222ab. Basics of Statistical Inference (D. Neuberg)
Introduces probability theory and mathematical statistics underlying techniques in public health research. Topics include probability distributions, means, variances and expected values, finite sampling distributions, parameter estimation, confidence intervals, and hypothesis testing. (5 credits)

BIO 223cd. Applied Survival Analysis and Discrete Data Analysis (P. Williams)
Covers topics in discrete analysis and applied survival analysis. Reviews sampling plans and contingency tables for discrete data. Discrete data topics include logistic regression, exact inference, and conditional logistic regression. Survival topics include hazard, survivor, and cumulative hazard functions; Kaplan-Meier and actuarial estimation of the survival distribution; and comparison of survival using log rank and other tests. (5 credits)

BIO 224t. Survival Methods in Clinical Research (R. Davis)
Covers common approaches to display and analysis of survival data, including Kaplan-Meier curves, log rank tests, and Cox proportional hazards regression. Computing, using SAS, is an integral part of the course. (2.5 credits)

BIO 225c. Multiple Regression Analysis for Health Policy and Management (S-L. Normand)
Provides a nonmathematical approach to the use and interpretation of regression modeling in health policy and management research, with emphasis on simple linear and multiple regression, including the analysis of variance. (2.5 credits)

BIO 226ab. Applied Longitudinal Analysis (G. Fitzmaurice)
Introduces modern methods for the analysis of correlated data, repeated measures, correlated outcomes, and longitudinal data. Topics include repeated measures ANOVA, random effects and growth curve models, and generalized linear models for correlated data, including generalized estimating equations (GEE). (5 credits)

BIO 228ab. Statistical Models and Methods in Human Genetics
Introduces basic methods and algorithms for the analysis of genetic data with an emphasis on gene mapping. Topics include basic human genetics, allele frequency estimation, segregation and linkage

Andrea G. Rotnitzky, MA, PhD (University of California, Berkeley); Associate Professor of Biostatistics. Longitudinal data analysis; analysis of repeated categorical data and cluster correlated data.

Louise M. Ryan, PhD (Harvard University); Professor of Biostatistics. Rodent tumorigenicity experiments; teratology experiments; clinical trials; goodness-of-fit tests; survival analysis.

Donna L. Spiegelman, SM, SD (Harvard University); Associate Professor of Epidemiology and Biostatistics. Binary data models with measurement error and misclassification in model covariates.

Kenneth E. Stanley, MA (Bucknell University), PhD (University of Florida); Lecturer on Biostatistics and Executive Director of the Center for Biostatistics in AIDS Research. Estimating mortality attributable to tobacco in the presence of incomplete information.

Marcia A. Testa, MPH, MPhil, PhD (Yale University); Senior Lecturer on Biostatistics. Design, methodology, measurement, and analytical techniques for evaluation of quality of life indices in therapeutic clinical trials; design and structure of clinical database information management systems.

Florin Vaida, PhD (University of Chicago); Assistant Professor of Biostatistics. Markov chain Monte Carlo; likelihood inference; nonparametric modeling; longitudinal data.

Matthew P. Wand, PhD (Australian National University); Associate Professor of Biostatistics. Nonparametric curve estimation; Markov chain Monte Carlo; computational statistics.

YouGan Wang, MS (Peking University), PhD (University of Oxford); Assistant Professor of Biostatistics. Sequential clinical and screening trials; quasi-likelihood; estimating functions and asymptotic inference; overdispersion in analysis of longitudinal data; resampling methods.

James H. Ware, PhD (Stanford University); Frederick Mosteller Professor of Biostatistics and Dean for Academic Affairs. Design and analysis of longitudinal studies; statistical aspects of environmental health research.

Lee-Jen Wei, PhD (University of Wisconsin); Professor of Biostatistics. Design and analysis of clinical trials; repeated measurements analysis; survival analysis.

Milton C. Weinstein, AM, MPP, PhD (Harvard University); Henry J. Kaiser Professor of Health Policy and Management (Health Policy and Management and Biostatistics); Professor of Medicine, Harvard Medical School. Cost-effectiveness of health practices and technologies.

Paige L. Williams, BSPH, PhD (University of North Carolina); Associate Professor of Biostatistics. Cancer risk assessment and other areas of environmental statistics, especially animal carcinogenicity bioassays.

David Wypij, ScM (Brown University), MS, PhD (Cornell University); Associate Professor of Biostatistics. Longitudinal data analysis; repeated measures and growth curve models; discrete data.

Ronghui (Lily) Xu, MA, PhD (University of California, San Diego); Assistant Professor of Biostatistics. Survival analysis, particularly in relation to proportional hazards models; goodness of fit.

Marvin Zelen, AM (University of North Carolina), PhD (American University); Professor of Statistical Science; Member of the Faculty of Arts and Sciences. Theory and practice of clinical trials; methodology for early detection of disease.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Roger B. Davis, MA (University of Rochester), SD (Harvard University); Associate Professor in the Department of Biostatistics. Design and analysis of clinical trials; recursive partitioning methods.

Dianne M. Finkelstein, AM (Wayne State University), PhD (University of Michigan); Associate Professor in the Department of Biostatistics. Carcinogenicity experiments; survival analysis; statistical methods for AIDS clinical trials and epidemiology.

Kimberlee Gauvreau, SM, SD (Harvard University); Assistant Professor in the Department of Biostatistics. Biostatistical issues in clinical studies in the field of pediatric cardiology; institutional variability in outcomes following surgery for congenital heart disease; postoperative course of patients undergoing repair of a single functional ventricle.

Richard D. Gelber, SM (Stanford University), PhD (Cornell University); Professor in the Department of Biostatistics. Design and analysis of clinical trials.

analysis, computing likelihood on pedigrees, nonparametric linkage tests, polygenic and multifactorial models, variance component analysis, and association tests. (5 credits) Not offered 1999-2000.

BIO 230ab. Probability Theory and Applications (D. Harrington)
Covers axiomatic foundations, frequency and personal concepts of probability, combinatorics, discrete and continuous sample spaces, independence and conditional probability, random variables, expectation operator, moments, generating functions and characteristic functions, standard distributions, transformations, sampling distributions related to the normal distribution, convergence concepts, weak and strong laws of large numbers, the central limit theorem, and elements of stochastic processes. (5 credits)

BIO 231cd. Statistical Inference I (R. Betensky)
Discusses principles of data reduction, describes methods of point and interval parameter estimation and the small and large sample properties of estimators, and covers methods of hypothesis testing and optimality properties of tests. (5 credits)

BIO 232ab. Methods I (Y. Wang)
Introduces common statistical models and methods for data analysis, including concepts of populations and samples, contingency tables, and the Bernoulli and Poisson distribution models. Other topics include methods for data analysis including chi-square tests, one- and two-sample t-tests, linear rank tests, correlation, ANOVA, and simple linear regression. (5 credits)

BIO 233cd. Methods II (M. Hughes)
Focuses on analysis of categorical and count data and introduces methods for analysis of survival data. Covers sampling plans, analysis of contigency tables, construction of confidence intervals and hypothesis tests, measures of association, logistic regression, and log-linear analysis. Includes survival topics such as estimation of survival distributions, comparison of groups, and regression models. (5 credits)

BIO 235cd. Regression and Analysis of Variance (F. Vaida)
Presents advanced topics in data analysis for linear models including regression and analysis of variance. Other topics include theoretical and data analysis perspectives on estimation methods and issues of inference. (5 credits)

BIO 240cd. Sample Surveys
Covers methods for design and analysis of sample surveys, including questionnaire design and evaluation. Topics in estimation methods include calculation and use of sampling weights, and variance estimation methods. (2.5 credits) Not offered 1999-2000.

BIO 243a. Nonparametric Methods (D. Wypij)
Introduces nonparametric methods, including permutation tests, permutation limit theorems, 2-sample rank tests and their asymptotic efficiency, k-sample rank tests, 1-sample tests of location, paired comparisions, rank tests for symmetry, and independence. (2.5 credits)

BIO 244ab. Analysis of Failure Time Data (S. Lagakos)
Discusses the theoretical basis of concepts and methodologies associated with survival data and censoring, nonparametric tests, and competing risk models. Develops much of the theory by using counting processes and martingale methods. (5 credits)

BIO 245ab. Analysis of Multivariate and Longitudinal Data (D. Wypij)
Presents classical and modern approaches to the analysis of multivariate observations, repeated measures, and longitudinal data. Topics include the multivariate normal distribution, estimation of the mean and covariance matrix, Hotelling's T2, MANOVA, the multivariate linear model, and random effects and growth-curve models. Discusses computational issues for traditional and new methodologies. (5 credits)

BIO 247cd. Design of Scientific Investigations
Covers aspects of statistical theory and practice relevant to the design of health-related scientific investigations. Topics include sample size considerations, basic principles of experimental design, block designs, factorial experiments, response surface modeling, clinical trials, adaptive designs, cohort studies, early detection trials, and double-sampling techniques. (5 credits) Not offered 1999-2000.

BIO 248cd. Advanced Statistical Computing (R. Gray)
Presents computing algorithms useful in statistical research and advanced applications. Topics include computer arithmetic, matrix algebra, numerical optimization methods with application to maximum likelihood estimation and GEEs, spline smoothing and penalized likelihood, numerical integration, and random number generation and simulation methods. (5 credits)

BIO 249ab. Bayesian Methodology in Biostatistics (J. Ibrahim)
Introduces the fundamentals of the Bayesian paradigm, including Bayes's theorem, the likelihood principle, prior distributions, posterior distributions, and predictive distributions. Topics include Bayesian analysis of linear models, generalized linear models, survival models, random effects models, Bayesian methods in meta-analysis, and design and analysis of clinical trials. (5 credits)

BIO 251cd. Statistical Inference II (M. Wand)
Considers advanced topics in statistical inference. Topics include limit theorems, multivariate delta

method, properties of maximum likelihood estimators, saddle point approximations, and asymptotic relative efficiency. (5 credits)

BIO 262ab. Statistical Problems in Drug Development (M. Testa)
Introduces applications of statistical methodology required for the various phases of pharmaceutical drug development. Features guest lecturers from the pharmaceutical industry. (2.5 credits) Not offered 1999–2000.

BIO 263cd. Computational Methods for Categorical Data Analysis (C. Mehta)
Studies nonparametric and semiparametric statistical methods of inference for a variety of problem types, with an emphasis on the development of efficient numerical algorithms for exact and Monte Carlo inference. (2.5 credits)

BIO 266d. Design and Analysis of Animal Bioassay
Provides a foundation for methodologic research in bioassay design and analysis. Emphasizes statistical issues in rodent carcinogenicity, developmental toxicity, and neurotoxicity bioassays. (2.5 credits) Not offered 1999-2000.

BIO 268ab. Statistical Methods in Human Genetics (K. Lunetta)
Introduces statistical procedures for investigating inheritance in humans, methods for human gene mapping, including family-based tests of association and linkage. (2.5 credits)

BIO 269b. Statistical Methods in Psychiatry (S-L. Normand, G. Fitzmaurice)
Covers assessment of inter-rater reliability, analysis of repeated measures experiments, methods for handling dropouts and missing data, measurement error models, ROC curves, and methods of segregation and linkage analyses. (2.5 credits) Not offered 1999-2000.

BIO 270ab. Statistical Science Outreach (M. Zelen, S-L. Normand)
Aims to broaden the background of students in probability and statistics. Students give short presentations from expository articles and papers chosen on the basis of ideas rather than technical content. (2.5 credits)

BIO 271ab. Statistical Computing Environments (M. Pagano)
Acquaints students with modern computing environments in the field of biostatistics. Topics include programming environments in statistics, algorithmic and symbolic mathematics, source language programming and its tools, editors, typesetters, Internet tools, and UNIX. (2.5 credits)

BIO 274cd. Applied Stochastic Processes and Models in Public Health (M. Zelen)
Develops aspects of stochastic processes that are relevant for modeling important problems in public health. Topics include Poisson processes, birth and death processes, Markov chains and processes, and semi-Markov processes. (5 credits)

BIO 276cd. Sequential Analysis
Introduces the methods of sequential analysis for hypothesis testing and estimation, defines Brownian motion and the related normal random walk, and presents general concepts of continuous time versus discrete time monitoring and rejection of the null versus "acceptance" of the null. Also includes the Sequential Probability Ratio Test, the related O'Brien-Fleming test, the repeated significance test, and the related Pocock test. (2.5 credits) Not offered 1999-2000.

BIO 278a. Regression with Non-Normal Data
Introduces generalized linear models as a unifying framework for commonly used statistical methods such as multiple regression, logistic regression, and Poisson regression. Develops likelihood inference using the exponential family of distributions, discusses extensions to quasi-likelihood methods, and covers nonparametric models in which the "linear" assumption of generalized linear models can be relaxed. (2.5 credits) Not offered 1999-2000.

BIO 279d. Smoothing in Biostatistical Modeling
Presents some of the main smoothing techniques by which non-linear structure can be incorporated into a statistical model without the need for parametric modeling. Discusses computational and some theoretical issues, using the computing package S-PLUS. (2.5 credits) Not offered 1999-2000.

BIO 284b. Spatial Statistics for Health Research (L. Ryan, M. Wand)
Introduces topics in spatial statistics, including types of data, kriging, parametric and non-parametric methods, and tests for spatial randomness. Students become proficient in the use of S-PLUS SpatialStats and ARCView software. (2.5 credits)

BIO 285cd. Semiparametric Methods (A. Rotnitzky)
Identifies the methods and problems of using semiparametric models, including the Cox proportional hazards model, models with conditional moment restrictions, truncated regression models, and censored regression models with unspecified error distribution. Covers model, parameter, estimator, and semiparametric variance bound definitions; the efficient score and efficient influence function; and empirical techniques. (2.5 credits)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or undertake special projects in the following areas: statistical methods; teaching of biostatistics; consultation; computing; study design; and data analysis.

Rebecca S. Gelman, PhD (State University of New York at Buffalo); Associate Professor in the Department of Biostatistics. Clinical trials; disease screening; survival methods.

Robert J. Glynn, MA (Boston College), PhD (Brandeis University), SM, SD (Harvard University); Associate Professor in the Department of Biostatistics. Analysis of longitudinal data; nonresponse in sample surveys; epidemiology of eye diseases.

Mei-Ling Ting Lee, MS (National Tsing-Hua University), MA, PhD (University of Pittsburgh); Assistant Professor in the Department of Biostatistics. Lifetime data analysis; categorical data analysis.

Sharon-Lise T. Normand, MSc (University of Western Ontario), PhD (University of Toronto); Associate Professor in the Department of Biostatistics. Bayesian inference; graphical models; meta-analysis.

E. John Orav, PhD (Stanford University); Associate Professor in the Department of Biostatistics. Statistical computing and simulation; stochastic modeling; bioassay.

Bernard A. Rosner, MA (Stanford University), PhD (Harvard University); Professor in the Department of Biostatistics. Analysis of clustered binary data; longitudinal data analysis.

David A. Schoenfeld, AM, PhD (University of Oregon); Professor in the Department of Biostatistics. Statistics in medical research; linear models; bioassay; survival theory.

Grace Wyshak, SM (Harvard University), PhD (Yale University); Associate Professor in the Departments of Biostatistics and Population and International Health. Biostatistical and demographic methods; women's reproductive health.

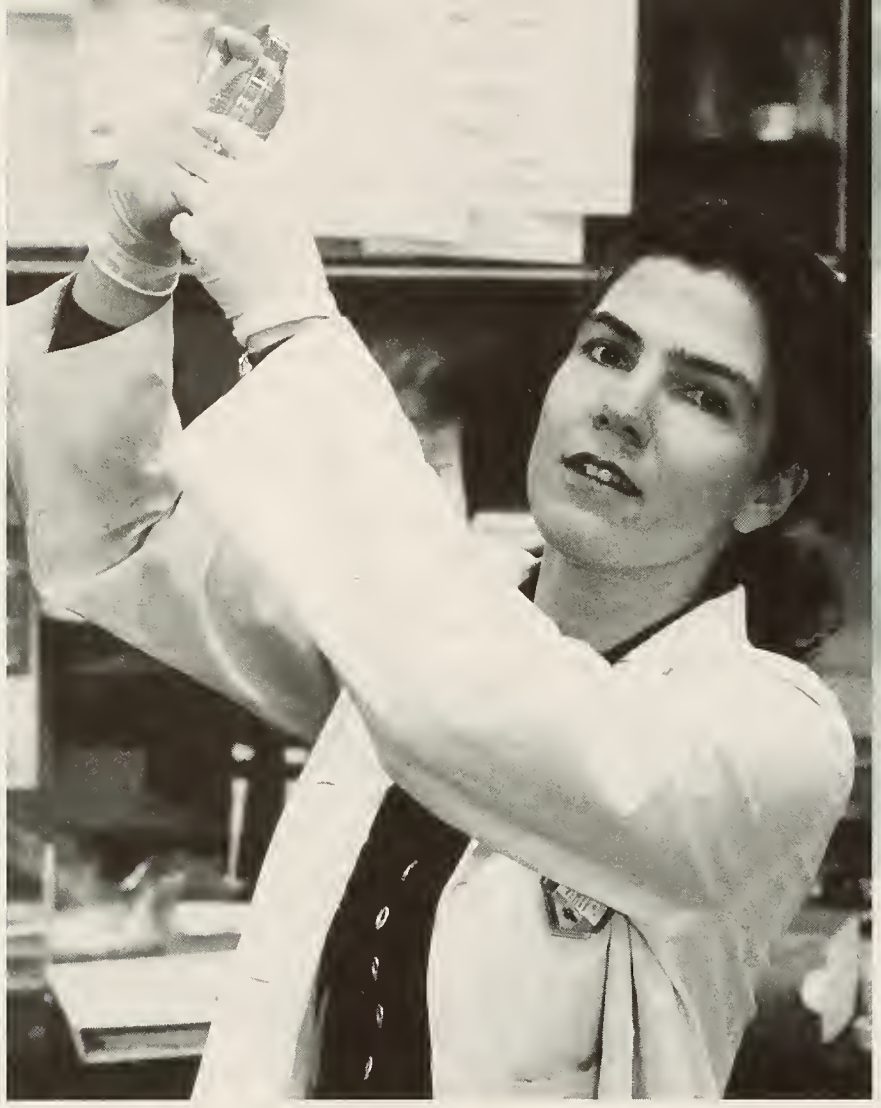
Adjunct Faculty

Cyrus R. Mehta, SM, PhD; President, Cytel Software Corporation.

DeJuran Richardson, MS, PhD; Associate Professor of Mathematics, Lake Forest College.

Nicholas J. Schork, MA, MA, PhD; Associate Professor, Department of Genetics, Case Western Reserve University.

Michael A. Stoto, PhD; Professor and Chair, Department of Epidemiology and Biostatistics, George Washington University.



Anastasia Koutsolioutsou
Doctoral Student
Department of Cancer Cell Biology

After completing undergraduate studies at MIT, Anastasia Koutsolioutsou returned to her native Greece and considered attending medical school.

Instead, she became involved with an environmental organization, the World Wide Fund for Nature, as a project manager for organic farming in Greece. "Working for a nonprofit project was a good experience. I saw how science could be relevant to a wider world," says Koutsolioutsou.

She came to HSPH and completed a master's degree in environmental health before enrolling as a doctoral student in cancer cell biology. "I wanted an in-depth knowledge of science, particularly disease mechanisms and events that underlie the initiation and progression of pathogenic conditions. Currently, I'm studying the effects of oxidative stress on bacteria and ways that bacteria protect themselves," she says.

Koutsolioutsou hopes her work will contribute to the prevention of disease in populations: "Ultimately, I would like my interests in science, health, and disease to help others."

The goals of the Department of Cancer Cell Biology are to promote and conduct research and training on the effects of radiation and environmental chemicals on the health of human beings.

The program features laboratory research that combines recent advances and techniques in biochemistry, molecular and cell biology, and genetics to focus on the mechanisms involved in the development of cancer and the means for its prevention. Specific emphases include the growth control of cancer cells, the damage and repair of DNA, particularly in response to chemicals and oxidants that are present in the environment, and the biological effects of low-dose radiation exposure. The department has component divisions of Radiation Biology and Toxicology.

Radiation Biology

The research and training program in Radiation Biology emphasizes studies at the cellular and molecular levels in an integrated approach to the investigation of the lethal, mutagenic, and carcinogenic consequences of exposure to radiation and chemical agents and the role of genetic instability in the development of cancer. Goals include not only defining the hazardous effects of such exposures, but also examining the mechanisms involved in these effects. Although the research includes both mechanistic and applied studies utilizing in vitro systems, primarily human cells in culture, emphasis is placed on a molecular-level approach that includes the use of a broad range of molecular biological and recombinant DNA techniques in the study of cell control, genomic instability, signal transduction, and genetic susceptibility to cancer.

Toxicology

The research and training program in Toxicology explores the interactions of environmental chemicals with a variety of cellular and sub-cellular systems, the biochemical and molecular mechanisms of toxicity, and the health implications of environmental exposure. As it is often necessary to consider and analyze the relation between chemical, biological, and social factors affecting both the nature of and response to occupational or environmental exposure, the program stresses interdisciplinary approaches that join the power of modern

molecular genetics and cell biology with the problem orientation of public health. Research includes such topics as biochemical and genetic responses to oxidative stress, molecular biology of the repair of DNA damage, and mutagenesis in prokaryotes and eukaryotes, genetic recombination and predictive carcinogenesis, and molecular mechanisms of genetic instability in cancer and aging.

Doctor of Philosophy in Biological Sciences in Public Health (BPH) (Cancer Cell Biology)

Students wishing to study in areas relevant to this department should apply to the PhD program in Biological Sciences in Public Health (BPH). This program offers the PhD degree through Harvard University's Graduate School of Arts and Sciences.

The PhD program is designed to offer a firm foundation in the basic biomedical sciences, as well as in epidemiology and biostatistics. Specific courses supplement this core, as dictated by individual research concentrations. Students in this program engage in laboratory rotations in three different research areas to enable them to assess realistically their interests in a thesis project and to evaluate the suitability of the laboratory and mentor. At the completion of these rotations, students select an area of concentration and a thesis research laboratory and complete the required curriculum. A qualifying examination must be passed before engaging in thesis work, and the thesis must be defended successfully before the granting of the PhD.

Applicants generally have a bachelor's degree and demonstrated competence in organic and biological chemistry, general biology, physics, and calculus. Those deficient in one of these areas may be admitted provisionally on the condition that appropriate courses will be taken before and/or after entering the program. Applicants must take both the GRE general and subject tests by October in order to meet the application deadline of December 15.

All students admitted to the program receive a stipend, as well as tuition and health insurance support. Students are encouraged to apply for fellowships from outside sources since certain external fellowships provide higher stipends. While funds to support international students are limited, one special scholarship is available each year for a student from a developing, sub-Saharan African country. There is also a university-wide fellowship program that provides funding to qualified underrepresented minority students in the sciences.

Graduates ordinarily assume positions as faculty members and research scientists in graduate schools, medical schools, research institutes, or schools of public health. Career opportunities in the biological sciences as they apply to public health are expected to grow both in academia and in the biotechnology and pharmaceutical industries.

Courses Offered by the Department of Cancer Cell Biology, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

CCE 204ab. Principles of Toxicology (R. Schiestl, D. Milton)
Emphasizes mechanisms of injury and clinical consequences following exposures to environmental and occupational chemicals. Examines actions at the molecular, cellular, organ system, and organismal levels. Discusses methods for detecting, evaluating, analyzing, and combating toxic effects. (5 credits)

CCB 207ab. Introduction to Cancer Biology: Radiation Biology (J. Little)
Examines the elements of cancer biology by studying the genotoxic and carcinogenic effects of ionizing radiation. Topics include the induction and repair of DNA damage, the processes of cell killing, mutagenesis and neoplastic cell transformation, and the properties of human cancers. Emphasizes human epidemiologic data for radiation carcinogenesis and their use in risk analysis. (5 credits) Not offered 1999-2000.

For more information about research and training in Cancer Cell Biology, please contact Rebecca Anapolle, Department of Cancer Cell Biology, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1871
Fax: 617-432-1780
E-mail: ranapoll@hsph.harvard.edu

For application materials and information about admission to the PhD program, please contact the Graduate School of Arts and Sciences Admissions Office, Harvard University, 8 Garden Street, Cambridge, MA 02138.
Phone: 617-495-5315

Applicants who have specific questions about the PhD program may contact Ruth Kenworthy, Administrator, Division of Biological Sciences, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4470
Fax: 617-432-4098
E-mail: kenworthy@cvlab.harvard.edu.

Faculty

Department Chair: John B. Little, MD (Boston University); James Stevens Simmons Professor of Radiobiology and Director of the John B. Little Center for Radiation Sciences and Environmental Health. Radiation biology and experimental carcinogenesis; cellular studies of transformation, mutagenesis, and cytogenetic damage in vitro; molecular mechanisms of mutagenesis and oncogene expression; genetic susceptibility to cancer in human populations.

Bruce Demple, PhD (University of California, Berkeley); Professor of Toxicology. Repair enzymes for oxidative DNA damage; molecular biology of cellular responses to oxidative stress. (On leave until August, 2000)

Karl T. Kelsey, MD (University of Minnesota), MOH (Harvard University); Professor of Environmental Health and Cancer Biology. Occupational and environmental carcinogenesis, with emphasis on the study of workplace mutagen and carcinogen exposure, using epidemiological application of cytogenetic and molecular endpoints.

Carl G. Maki, PhD (Kansas State University); Assistant Professor of Radiobiology. Cancer biology; radiation research; DNA repair; cell cycle regulation.

Leona D. Samson, PhD (University of London); Professor of Toxicology. Cell response to DNA damage at the biological, biochemical, and genetic levels; mechanisms of mutagenesis and cell killing.

Robert H. Schiestl, PhD (University of Vienna); Associate Professor of Toxicology. Mechanisms of DNA repair and recombination with relevance to carcinogenesis and gene targeting, examined through studies carried out in the yeast *Saccharomyces cerevisiae* in human and mouse cells and in transgenic animals.

Dieter Wolf, MD (University of Munich); Assistant Professor of Toxicology. Maintenance of normal genome copy through replication control and genetic identification of conserved components; role of proteolysis in replication control.

Zhi-Min Yuan, MD (Jiangxi Medical College), PhD (University of Maryland); Assistant Professor of Radiobiology. Cancer biology; radiation research; cell cycle regulation; signaling pathways.

The following faculty member has a secondary appointment at HSPH. His primary affiliation is with Harvard Medical School.

Howard L. Liber, PhD (Massachusetts Institute of Technology); Associate Professor in the Department of Cancer Cell Biology. Development and utilization of cellular and molecular methods to investigate mutagenesis in human cells, from both mechanistic and environmental perspectives.

Adjunct Faculty

Peter Ofner, MRSC, PhD; Associate Professor, Department of Pharmacology and Experimental Therapeutics, Tufts University School of Medicine.

Robert Schlegel, MPH, PhD; Manager, Corning Division, Ciba/Chiron Corporation.

Yuji Tanaka, MD; Assistant Professor of Medicine, University of Tokyo School of Medicine.

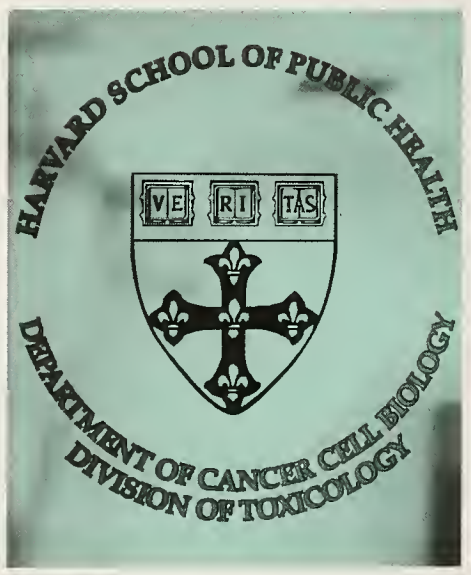
CCB 210ab. Introduction to Cancer Biology
Emphasizes current experimental approaches to studying cancer biology and the process of carcinogenesis. Topics include the biology of cell modification and differentiation, the phenotype of the cancer cell, properties of human and animal cancers, the process of cell transformation, mutagenesis, carcinogen metabolism, and cancer epidemiology. (5 credits)

CCB 225cd. Genetic Toxicology (L. Samson)
Explores the biological consequences of the interaction of DNA damaging agents with the genome. Topics include DNA structure, DNA repair, DNA damage-inducible processes, mutagenesis and mutational spectra, cell death by apoptosis, and genetic toxicity testing. (5 credits) Not offered 1999-2000.

EPC 249a. Molecular Biology for Epidemiologists (B. Glassner, D. Hunter)
Presents an overview of molecular biology and techniques commonly used in the laboratory and in epidemiological research. Topics include the structure of DNA and genes, DNA replication, transcription, and RNA translation. (2.5 credits)

CCB 250cd. Molecular and Cellular Toxicology (B. Demple)
Examines key issues and approaches in modern toxicology, focusing on emerging research at the molecular and cellular levels. Topics include pathology of the cell cycle, carcinogenesis, genetic toxicology, and molecular epidemiology. (5 credits)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or to undertake specialized readings or studies in molecular, cellular, biochemical, and environmental toxicology.



Andrey Egorov
Doctoral Student
Department of Environmental Health

Andrey Egorov trained as a hydrologist in Moscow, and visited the US as an interpreter for Russian specialists learning about the environment. Soon after, he became involved with a Harvard project in Russia that studies environmental health, which later brought him to HSPH.

Through this project, he is helping to develop affordable water quality monitoring methods for use in Russia and other countries, such as India. "There are high rates of undiagnosed intestinal diseases," he says. "There are also high levels of chlorination byproducts in the tap water. I want to demonstrate a statistical association between water quality and health problems found in the Russian population."

Egorov enjoys the ability to cross-register at MIT and at other Harvard schools, because this gives him access to knowledge in a variety of disciplines.

The mission of the Department of Environmental Health is to advance the health of all people in occupational and community settings in the US and around the world through research and training in environmental health. Faculty in the department study the pathogenesis and prevention of environmentally produced illnesses and act as a catalyst for scientifically based public health advances. Research approaches range from the molecular to the epidemiologic.

The Department of Environmental Health focuses on complex problems that require the insights of many specialties. The department's faculty, research staff, and students reflect the multidisciplinary nature of the field and include chemists, engineers, epidemiologists, applied mathematicians, physicians, occupational health nurses, physiologists, cell biologists, molecular biologists, and physicists. Teaching and research activities of the department are carried out through four main concentrations: Environmental Epidemiology, Environmental Science and Engineering, Occupational Health, and Physiology, as well as several areas of interest that span two or more concentrations. All of these are described below.

ENVIRONMENTAL EPIDEMIOLOGY

Environmental epidemiology focuses on identifying and measuring the influence of environmental factors (physical, chemical, and biologic) on human disease in a community to provide scientific evidence for sound environmental and health policies. The research program integrates epidemiologic methods with physiologic assessment of health and advanced analytic methods to assess environmental health risks, including the cognitive and cardiovascular effects of lead; the effects of air pollution on respiratory and cardiovascular health; the effects of infectious agents and disinfection byproducts in drinking water; and biomarkers of environmental exposure. The Environmental Epidemiology concentration has research and training projects under way around the globe, including Western, Eastern, and Central Europe, Central and South America, China, and Pacific Rim countries.

The degree programs in this area prepare students for research careers in environmental epidemiology. Recent graduates hold positions in academic institutions, in government agencies, and as private consultants. Financial support for Environmental Epidemiology students may be available to US citizens and permanent resi-

For more information about research and training in Environmental Epidemiology, please contact Douglas W. Dockery, SD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0729
Fax: 617-277-2382
E-mail: ddockery@hsph.harvard.edu

Faculty

Department Chair: Joseph D. Brain, SM, SM, SD (Harvard University); Cecil K. and Philip Drinker Professor of Environmental Physiology and Director of the Kresge Center for Environmental Health. Function and structure of pulmonary macrophages; deposition and clearance of inhaled particles and responses to them; respiratory infection.

Harriet A. Burge, MA (San Francisco State University), PhD (University of Michigan); Associate Professor of Environmental Microbiology. Aerobiology; bioaerosols in indoor air; fungus allergen ecology, characterization, prevalence, and health effects.

James P. Butler, AM, PhD (Harvard University); Senior Lecturer on Physiology. Lung structure and function; parenchymal micromechanics; magnetic twisting cytometry; nemoendocrinology; avian physiology.

David C. Christiani, MD (Tufts University), SM, MPH (Harvard University); Professor of Occupational Medicine and Epidemiology and Director of the Harvard Education and Research Center for Occupational Safety and Health; Professor of Medicine, Harvard Medical School. Occupational diseases; biomarkers and molecular epidemiology.

Jack T. Dennerlein, SM (Massachusetts Institute of Technology), PhD (University of California, Berkeley); Assistant Professor of Ergonomics and Safety. Work-related chronic musculoskeletal disorders; design of human-machine interfaces.

Douglas W. Dockery, SM (Massachusetts Institute of Technology), SM, SD (Harvard University); Professor of Environmental Epidemiology; Associate Professor of Medicine (Epidemiology), Harvard Medical School. Epidemiologic studies of respiratory health effects of air pollution; environmental exposures and lifetime development of respiratory disease.

dents through NIH-sponsored training grants. A training grant from the NIH Fogarty Institute also provides support for fellows and students from the People's Republic of China.

The Environmental Epidemiology concentration offers both a four-semester and a two-semester Master of Science (SM) program in Environmental Health, as well as a program leading to the Doctor of Science (SD) degree. Areas of interest in both programs are as follows: Chronic Respiratory Disease, Asthma, Cardiovascular Disease, Cancer, Indoor and Outdoor Air Pollution, Heavy Metals, Water Pollution, Radiation, and Population Genetics. The program collaborates with the Department of Epidemiology for students seeking an SD in Epidemiology with a focus on environmental health. Please see page 10 for information about the Master of Public Health concentrations in Occupational and Environmental Health and in Quantitative Methods.

Master of Science in Environmental Health (four-semester program)

Environmental Epidemiology Concentration

The master's programs in Environmental Epidemiology provide students with basic skills in environmental exposure assessment and epidemiologic methods, in preparation for research or academic careers. The four-semester (80-credit) SM program is designed for individuals who hold a bachelor's degree and have strong quantitative skills.

Required courses include: BIO 200, *Principles of Biostatistics;* EPI 201, *Introduction to Epidemiology*; EPI 202, *Elements of Epidemiologic Research*; EPI 203, *Design of Case-Control and Cohort Studies*; EPI 204, *Analysis of Case-Control and Cohort Studies*; EH 205, *Human Physiology;* EHE 215, *Environmental and Occupational Epidemiology*; and BIO 210, *The Analysis of Rates and Proportions*. Students are encouraged to participate in research seminars within the Environmental Epidemiology program and affiliated groups.

Master of Science in Environmental Health (two-semester program)

Environmental Epidemiology Concentration

Like the four-semester program, the two-semester (40-credit) SM program in Environmental Epidemiology provides students with basic skills in exposure assessment and epidemiologic methods, in preparation for research or academic careers. The required courses are the same as for the four-semester SM. The remainder of the schedule reflects areas of specific interest to the students. The two-semester program is open to applicants with a medical degree or a master's degree in a related scientific discipline. Students may enroll on a part-time basis, completing the program over two years.

Doctor of Science in Environmental Health

Environmental Epidemiology Concentration

Applicants to the SD program in Environmental Epidemiology should have a master's degree in environmental health, epidemiology, or biostatistics, as well as strong quantitative skills. Doctoral students must fulfill the course requirements for a major in environmental health (20 credits) plus a minor in epidemiology (10 credits) and one other field (10 credits). In addition, they must pass a written departmental comprehensive examination, pass the schoolwide oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and complete, defend, and submit a thesis. The thesis consists of three or more publishable papers reporting epidemiologic studies of environmental exposures.

Students interested in a research career are encouraged to apply to the doctoral program in Epidemiology with a minor in Environmental Health. Candidates for an SD in Epidemiology must meet all of the requirements of that department.

Doctoral students may receive financial support through research assistantships. Some financial support for doctoral students who are US citizens or permanent residents is available through NIH traineeships.

ENVIRONMENTAL SCIENCE AND ENGINEERING

The concentration in Environmental Science and Engineering emphasizes the chemical, physical, microbiological, engineering, and risk assessment aspects of environmental and occupational exposures. Concentration faculty measure and model ambient, indoor, and personal exposures to environmental and workplace contaminants; develop instruments and methods for collecting, analyzing, and assessing the effects of physical, chemical, and biological factors; conduct risk evaluations of new products, fuels, water supplies, technologies, and remediation strategies. Collaborative teaching and research is conducted in many countries, including Mexico, Chile, China, Austria, Columbia, Greece, Russia, Slovakia, India, Korea, Taiwan, Japan, the Netherlands, and Germany.

Students in this concentration take the following core courses: EH 205, *Human Physiology*; EH 263, *Analytical Chemistry and Exposure Assessment*; EH 292, *Air Pollution: Properties of Gases and Particles*; EHE 215, *Environmental and Occupational Epidemiology*; EHH 500, *Risk Assessment*; EHH 501, *Regulatory Toxicology*; BIO 201, *Introduction to Statistical Methods*; and EPI 201, *Introduction to Epidemiology*. Advanced courses in environmental science are oriented toward a specific pollutant or medium (such as air, surface water, or groundwater); they may focus on monitoring, modeling, or the control of the pollutants, or they may emphasize resources and occupational management, regulation, and policy. Most students also take courses at the John F. Kennedy School of Government and at MIT. Students specialize in one of five areas of interest, each of which has additional course requirements. In addition to the four areas of interest that follow, students may focus on Water Pollution or Ergonomics and Safety (see page 35).

Environmental Health Sciences This area is designed for those interested in identifying and characterizing human and ecological exposures to environmental contaminants. It provides training in air and water environments, environmental microbiology (both aquatic and aeroallergens), radiological health, hazardous and solid waste, exposure assessment, and pollution prevention. Graduates take positions in government agencies, such as the Environmental Protection Agency, in industry, and as consultants. Doctoral graduates also take positions in academia.

In addition to the general core requirements, areas of interest have specific course requirements plus related electives. Faculty members associated with the Environmental Science and Engineering concentration conduct large national and international research projects in air and water quality, exposure and risk assessment, and radiological health, providing research opportunities for both master's and doctoral students.

Doctoral students in Environmental Health Sciences are typically funded either fully or partially by the program through research assistantships or training grant fellowships.

Environmental Health Management This area is intended for midcareer professionals with backgrounds in environmental science or engineering and interests in the interface between environmental science and policy in developing countries. The program consists of a set of core courses in environmental health science, risk assessment, and decision analysis supplemented by electives chosen to build strength in one of four areas: energy and air pollution policy, drinking water and health, management of chemical wastes and pesticides, or environmental management and strategy.

Environmental Science and Risk Management This area is offered jointly by the Department of Environmental Health and the Department of Health Policy and Management. Providing students with an integrated education in environmental science, risk analysis, and decision making, this area is designed for students interested in pursuing professional and research careers in risk assessment and management in the private or public sector. The SM program is directed toward the growing number of students

Applicants to the doctoral program in Environmental Science and Engineering are strongly encouraged to arrange an interview with faculty members. Please contact Linda A. Fox, Administrator, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3351
Fax: 617-432-4122
E-mail: lfox@hsph.harvard.edu

For more information about research and training in Environmental Health Sciences, please contact the Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.

(Aerobiology)
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For more information about research and training in Environmental Science and Risk Management, please contact Kristine Forsgard, Deputy Director for Academic Programs, Department of Health Policy and Management, Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4511
Fax: 617-432-4494
E-mail: kforsgar@hsph.harvard.edu

Claire M. Doerschuk, MD (Rush Medical College); Associate Professor of Physiology and Cell Biology. Transit of leukocytes through normal pulmonary microvasculature and the response of leukocytes to inflammatory stimuli within the lungs.

John S. Evans, SM (University of Michigan), SM, SD (Harvard University); Senior Lecturer on Environmental Science. Assessment of human exposures to pollutants; evaluation of uncertainty; application of decision analysis; assessment of health risk from waste disposal and energy production.

Timothy E. Ford, PhD (University of Wales, Bangor); Associate Professor of Environmental Microbiology. Surface, source, and drinking water microbiology; microbial cycling/transformation of pollutants; microbiologically influenced corrosion; groundwater-surface water interactions; aerosolization of microorganisms and microbial products.

Jeffrey J. Fredberg, SMME, ME, PhD (Massachusetts Institute of Technology); Professor of Bioengineering and Physiology; Associate Professor of Pediatrics, Harvard Medical School. Identification of the mechanical basis of airway and lung parenchymal function at the levels of organ, tissue, cell, and protein.

Beatriz S. González-Flecha, MS, PhD (University of Buenos Aires); Mark and Catherine Winkler Assistant Professor of Molecular Biology and Environmental Health. Biochemistry of oxygen free radicals; oxidative stress in biological systems; mechanisms of oxidative damage in eukaryotic and prokaryotic cells; intracellular sources of oxygen free radicals and adaptive responses to oxidative stress.

For more information about research and training in Industrial Hygiene and Occupational Safety, please contact Thomas J. Smith, PhD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3315
Fax: 617-432-0219
E-mail: tsmith@hohp.harvard.edu

interested in pursuing careers dedicated to solving problems at the interface between environmental science and public policy. The SD degree prepares students for either professional or research careers.

The curriculum includes course work in both the environmental sciences (for example, human physiology, risk assessment and regulatory toxicology, analytic chemistry and exposure assessment, and environmental and occupational epidemiology) and in the decision sciences (for example, decision, cost-effectiveness, and cost-benefit analysis, and environmental and resource economics). These core requirements are supplemented by required courses in biostatistics and electives in environmental policy, law, and management. Although a thesis is not required for the SM degree, each student is expected to complete a practicum in environmental risk and decision analysis.

Doctoral students in this area are typically either partially or fully funded through research assistantships or training grant fellowships.

Industrial Hygiene and Occupational Safety
This area is designed for those interested in the anticipation, identification, evaluation, and control of occupational hazards. Graduates take positions at local and federal agencies, such as NIOSH, at private companies with occupational health programs, or at research institutions and universities investigating occupational hazards. Doctoral graduates often fill faculty posts at schools of public health.

Faculty research in Industrial Hygiene and Occupational Safety spans a variety of areas, including retrospective exposure assessment for epidemiologic studies of lung cancer risk from manmade vitreous fibers and of kidney cancer risk from aliphatic hydrocarbons; physiologic and behavioral determinants of exposure avoidance by arc welders; toxicokinetic modeling of exposure-dose relationships; and petroleum hydrocarbon exposures associated with adverse effects on reproductive function.

In addition to the general core requirements, areas of interest have specific course requirements. (Those participating in the internship program or specializing in hazardous waste are subject to slightly different requirements.)

Students in the four-semester program who have limited work experience are encouraged to take a three-or six-month internship between their first and second years of study. Interns work under the supervision of a professional industrial hygienist in a private company or research setting to evaluate occupational hazards and develop applied research skills.

Tuition support may be available through a NIOSH Education and Research Center Grant for highly qualified US citizens or permanent residents concentrating in Industrial Hygiene and Occupational Safety. Support for these students may also be obtained through fellowship programs offered by the Department of Energy or by the Oak Ridge Institute for Science and Education.

As described below, the Environmental Science and Engineering concentration offers both a four-semester and a two-semester Master of Science (SM) program in Environmental Health, as well as a program leading to the Doctor of Science (SD) degree. Please see page 10 for information about the Master of Public Health concentration in Occupational and Environmental Health.

Master of Science in Environmental Health (four-semester program)

Environmental Science and Engineering Concentration

Applicants to the four-semester (80-credit) SM program in Environmental Science and Engineering normally hold a bachelor's degree. For study in Environmental Health Sciences, the degree should be in engineering, chemistry, physics, biology, or mathematics; in Environmental Science and Risk Management, the preferred degree is in physical science, engineering, or the social and management sciences. Normally, students also have several years of work experience in the envi-

ronmental field. For Industrial Hygiene and Occupational Safety, the degree should be in engineering, chemistry, physics, or quantitative or molecular biology. In Water Pollution, the preferred degree is in engineering, chemistry, physics, biology, or environmental sciences. Applicants with other degrees who have appropriate scientific and quantitative preparation may also be considered. Most applicants have relevant work experience. Admission decisions are based on academic records, standardized test scores, letters of recommendation, and prior experience.

Master of Science in Environmental Health (two-semester program)

Environmental Science and Engineering Concentration

Applicants with exceptional credentials may request consideration for admission to a two-semester (40-credit) SM program in Environmental Science and Engineering studying Environmental Health Sciences or Industrial Hygiene and Occupational Safety. Candidates for the former program normally have a bachelor's degree in engineering, chemistry, physics, biology, or mathematics, as well as an advanced degree or at least two years of work experience in the environmental field. The two-semester Industrial Hygiene and Occupational Safety program is designed for practitioners with extensive experience who seek a professional credential; candidates may hold a master's or doctoral degree in engineering, chemistry, physics, quantitative or molecular biology, or a related field. Professionals from developing countries are particularly encouraged to apply. In addition to courses offered during the fall and spring semesters, relevant courses are offered during the Summer Session for Public Health Studies (see page 82). Because entry into the two-semester program is based on the applicant's ability to waive several of the required courses listed in the concentration descriptions above, students' programs are designed individually.

Doctor of Science in Environmental Health

Environmental Science and Engineering Concentration

Applicants to the doctoral program in Environmental Science and Engineering studying Environmental Health Sciences normally have a master's degree in environmental science or a related field and strong scientific and quantitative skills. Those applying to study in Environmental Science and Risk Management normally have a master's degree plus two to three years of work experience. This area is designed for students interested in research in the related fields of environmental risk assessment and decision making. Industrial Hygiene and Occupational Safety applicants normally hold a master's (in rare cases, only a bachelor's) degree in engineering, chemistry, physics, or quantitative or molecular biology. Applicants are also expected to have relevant work experience. Applicants to Water Pollution normally hold a master's (in rare cases, only a bachelor's) degree in engineering, chemistry, physics, biology, or environmental sciences. Applicants are also expected to have relevant work experience.

Students undertake a comprehensive program in their specialty area, as outlined in the descriptions above, and must fulfill course requirements for one major (20 credits) and two minor (10 credits each) fields. Admission into the doctoral program in all areas of interest depends upon demonstrated competence in the requirements for one of the SM programs described above. Doctoral candidates must pass the departmental written examination and the school-wide oral qualifying examination; adhere to the doctoral timetable for maintaining satisfactory progress; complete, defend, and submit a thesis; and serve as a teaching assistant for the equivalent of three 5-credit courses. During the course of their program, most doctoral students also take advantage of opportunities to present papers at scientific conferences.

Additional areas of interest are described on page 35.

Joseph J. Harrington, AM, PhD (Harvard University); Professor of Environmental Health Engineering (Environmental Health and Population and International Health); Gordon McKay Professor of Environmental Engineering, Faculty of Arts and Sciences. Water resources planning and quality management; environmental monitoring and control systems; applied statistics for modeling; management for tropical disease control.

Russ B. Hauser, MD (Albert Einstein College of Medicine), MPH, SD (Harvard University); Assistant Professor of Occupational Medicine. Occupational lung diseases; environmental agents and allergic airways disease; male reproductive epidemiology.

Robert F. Herrick, MS (University of Michigan), SD (Harvard University); Lecturer on Industrial Hygiene. Exposure-reactive aerosols; characterization of complex exposures; interaction of individuals with a source of exposure.

Howard Hu, MD (Albert Einstein College of Medicine), MPH, SM, SD (Harvard University); Associate Professor of Occupational Medicine. Epidemiology of chronic lead toxicity using biomarkers of bone lead accumulation and genetic susceptibility.

Karl T. Kelsey, MD (University of Minnesota), MOH (Harvard University); Professor of Environmental Health and Cancer Biology. Occupational and environmental carcinogenesis, with emphasis on the study of workplace mutagen and carcinogen exposure, using epidemiological application of cytogenetic and molecular endpoints.

Petros Koutrakis, MS, PhD (University of Paris); Professor of Environmental Sciences. Sampling and analysis of air pollutants; atmospheric, indoor air, and aerosol chemistry; application of multivariate techniques to source apportionment; acid rain; urban air pollution.

Donald K. Milton, MD (Johns Hopkins University), MPH, DPH (Harvard University); Associate Professor of Occupational and Environmental Health. Measurement of airborne endotoxin; epidemiology of acute and chronic responses to bioaerosol exposure.

Joseph P. Mizgerd, SD (Harvard University); Assistant Professor of Physiology and Cell Biology. Physiology of inflammation, particularly the molecular mechanisms regulating the emigration of neutrophils.

Richard R. Monson, MD, SM, SD (Harvard University); Professor of Epidemiology (Environmental Health and Epidemiology) and Associate Dean for Professional Education. Relationship between the workplace, the environment, and disease.

Joseph D. Paulauskis, MS, PhD (Miami University); Associate Professor of Molecular Biology. Molecular/biochemical mechanisms of toxicity for environmentally relevant contaminants; gene regulation during pulmonary inflammation.

Lorenz R. Rhomberg, PhD (State University of New York at Stony Brook); Assistant Professor of Risk Assessment (Health Policy and Management and Environmental Health). Critical analysis of the methods and procedures of human risk assessment, especially quantitative methods for putative carcinogens.

John J. Rogus, SD (Harvard University); Assistant Professor of Population Genetics (Environmental Health and Biostatistics). Development of statistical methods to localize genes for common, genetically complex diseases such as asthma, hypertension, and diabetic neuropathy; development of resampling methods to accommodate highly correlated genomic data.

Stephen N. Rudnick, MS (University of Pennsylvania), SM, SD (Harvard University); Lecturer on Industrial Hygiene Engineering. Engineering control of particulate air contaminants in indoor and occupational settings and engineering control systems; sampling and analysis of air contaminants.

Joel D. Schwartz, PhD (Brandeis University); Associate Professor of Environmental Health. Environmental epidemiology; natural history of lung function and disease; cost-benefit analysis; nonclassical time series analysis; nonparametric smoothing and graphical methods in epidemiology.

For more information about research and training in Occupational Health Nursing, please contact Carol Somers, Occupational Health Program, 665 Huntington Avenue, Boston, MA 02115.
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www: hsph.harvard.edu/erc

OCCUPATIONAL HEALTH

This concentration is designed to train occupational safety and health professionals to recognize and prevent occupational injuries and disease. Faculty carry out research spanning a wide range of occupational health problems, with the broad objective of identifying and contributing to the reduction or elimination of job-related health hazards. Areas of interest include respiratory disease among exposed populations, including auto workers, textile workers, agricultural workers, workers exposed to fuel-oil ash, and building occupants; reproductive and chronic disease studies of populations exposed to petrochemicals and heavy metals; biological and chemical hazards assessment; epidemiology of acute injury and cumulative trauma disorders; occupational and environmental cancers such as lung, skin, and bladder cancer; biomonitoring and medical surveillance; worker training; and occupational health research and training in developing countries. Faculty members have been in the forefront of the development of biochemical and molecular markers and their applications in epidemiologic studies of exposed populations.

The training programs in occupational safety and health are offered through the NIOSH-sponsored Harvard Education and Research Center for Occupational Safety and Health. As described below, the following programs are offered: Master of Science (SM) and Doctor of Science (SD) in Environmental Health with a focus on Industrial Hygiene and Occupational Safety; MSN in Primary Health Care Nursing (from Simmons College) and SM in Environmental Health with a focus on Occupational Health Nursing (from Harvard University), both in cooperation with Simmons College; Master of Occupational Health (MOH); SM in Environmental Health with a focus on Occupational Safety and Health; and SD in Environmental Health with a concentration in Occupational Health or Occupational Epidemiology, or Doctor of Public Health (DPH). Additional areas of interest include Occupational Epidemiology, Environmental and Occupational Molecular Epidemiology, Population Genetics, and Ergonomics and Safety. Please see page 10 for information about the MPH concentration in Occupational and Environmental Health.

Master of Science in Primary Health Care Nursing (one-year program)

Occupational Health Concentratiion

This program is offered by the Educational Resource Center and Simmons College, which awards the degree. It is designed for registered nurses who are seeking preparation as occupational health nurse practitioners.

Participants undertake practica in industrial settings, clinics, and hospital-based occupational health programs and complete the following courses, taught at Simmons College: NUR 404, *Normal and Abnormal Human Physiology*; NUR 406, 407, 408, *Research Methods I, II, III*; NUR 480, 482, *Theory and Practice: Primary Health Care Nursing I, II*; NUR 481, *Theoretical Foundations for Nursing Practice*; NUR 422, *Clinical Pharmacology for Nurses in Ambulatory Care*; NUR 485, 486, *Health in the Workplace I, II*; GSHS 900, *Introduction to Health Care Systems*; NUR 470, *Health Promotion in Primary Care Nursing*; and EH 231, *Occupational Health Policy and Administration*.

Applicants must have at least a bachelor's degree in nursing from a program accredited by the National League of Nursing, must show satisfactory completion of basic statistics and physical assessment courses, and must be registered to practice nursing in a US state or territory. Tuition support may be available for US citizens or permanent residents through NIOSH traineeships or other traineeships or scholarships.

Four-semester, dual-degree Master of Science in Environmental Health (HSPH) and Primary Health Care Nursing (Simmons College)

Occupational Heath Concentration

The dual-degree program in Occupational Health Nursing is also aimed at preparing nurses for positions as occupational health nurse practitioners. It emphasizes identifica-

Occupational and Environmental Medicine Residency

This residency emphasizes the development of skills in clinical occupational and environmental medicine and epidemiology. During this year, acquired knowledge and abilities are applied to patient management and workplace community problem solving, and at least one short-term research project is designed, executed, and documented under faculty supervision. Field experience includes rotations through hospital- and community-based occupational and environmental health clinics. Additional rotation choices are available in corporate medical departments and governmental agencies. The residency is fully accredited by the Accreditation Council for Graduate Medical Education.

Applicants must be graduates of an approved school of medicine and must have completed at least one year of internship training in a US or Canadian clinical residency; board eligibility or certification in a primary care specialty is preferred. Physicians currently holding positions in the field of occupational safety and health who plan to return to these positions are considered strong candidates for admission. In addition to submitting an application to the degree program, prospective residents should send a letter of interest to the Occupational Health Program, enclosing a curriculum vitae listing medical training and experience, research experience, and publications. Admission to the practicum year of the residency is a separate process from, and usually occurs shortly after, admission to the degree program. Applicants who require early notification of admission to the residency program should indicate this in a cover letter accompanying the application form. Applicants to the MOH program and the MPH program with a concentration in Occupational and Environmental Health who are also applying to the Occupational and Environmental Medicine Residency Program must apply by September 1, 1999, for 2000-2001 matriculation. Continuation into the second year of the residency is contingent upon having had adequate prior clinical experience and exemplary performance in the didactic phase of the program.

Some financial support for residency candidates who are US citizens or permanent residents may be available through traineeships or National Research Service Awards.

For more information about the Occupational and Environmental Medicine Residency program, please contact Howard Hu, MD, SM, SD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2790
Fax: 617-432-0219
www: hsph.harvard.edu/erc

For more information about the Master of Occupational Health program, or research and training in Occupational Safety and Health, please contact David C. Christiani, MD, MPH, SM, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1260
Fax: 617-432-0219
E-mail: dchris@hohp.harvard.edu
www: hsph.harvard.edu/erc

Jacob Shapiro, SM (Brown University), PhD (University of Rochester); Lecturer on Biophysics in Environmental Health. Occupational and environmental radiation protection; low-level radioactive waste disposal; radiation dosimetry and protection standards; environmental radiation surveillance.

James P. Shine, PhD (University of Massachusetts); Assistant Professor of Aquatic Chemistry. Distribution, fate, and effects of contaminants in aquatic ecosystems; influence of environmental variables on routes of exposure to toxic substances, effects on human and ecological health.

Stephanie A. Shore, PhD (McGill University); Associate Professor of Physiology. Airway physiology and pharmacology; role of neuropeptides in the pathogenesis of airway disease.

Thomas J. Smith, MPH, MS, PhD (University of Minnesota); Professor of Industrial Hygiene. Evaluation of exposure-response relationships through occupational epidemiologic studies; application of pharmacokinetic modeling to study exposure-tissue dose relationships; lab and field simulations to characterize exposure determinants.

Stover H. Snook, AM (Fordham University), PhD (Tufts University); Lecturer on Ergonomics. Low-back pain; manual materials handling; heat stress; fatigue; stairway design; personal protective equipment; cumulative trauma disorders.

tion of health hazards, workplace assessment, program planning and intervention, worker health promotion, and disease and injury prevention. The program integrates curricula from HSPH and Simmons College, with courses taken concurrently at both institutions. Nurses interested in this program must apply to, be accepted by, and maintain satisfactory academic progress in both schools.

Students in the dual degree program fulfill essentially the same course requirements at Simmons College as those enrolled in the one-year MSN program. In addition, they must take the following HSPH courses: EH 243, *Ergonomics/Human Factors*; EH 262, *Introduction to the Work Environment*; EH 241, *Occupational Safety*; ID 263, *Practice of Occupational Health*; BIO 200, *Principles of Biostatistics*; EPI 200, *Principles of Epidemiology*; EH 231, *Occupational Health Policy and Administration*; EHE 215, *Environmental and Occupational Epidemiology*; EH 300, *Tutorial in Toxicology*; and two electives. Students must also complete an independent study project.

Applicants must have at least a bachelor's degree in nursing from a program accredited by the National League of Nursing, must show satisfactory completion of a basic statistics course, and must be registered to practice nursing in a US state or territory. Tuition support may be available for US citizens or permanent residents through NIOSH traineeships or other traineeships or scholarships.

Master of Occupational Health

Occupational Health Concentration

This two-semester (40-credit) program is designed to train physicians in the public health disciplines relevant to the prevention and control of occupational disease and

Frank E. Speizer, MD (Stanford University); Professor of Environmental Science; Professor of Medicine, Harvard Medical School. Environmental epidemiology; pulmonary diseases; cancer and nutrition; health effects of air pollution; occupational and environmental medicine.

John D. Spengler, PhD (State University of New York at Albany), SM (Harvard University); Akira Yamaguchi Professor of Environmental Health and Human Habitation. Assessment of human exposures to environmental contaminants; application of advanced particle analysis techniques to identify source contributions to indoor and ambient aerosols; building-related illnesses.

Helen H. Suh, SM, SD (Harvard University); Assistant Professor of Environmental Chemistry and Exposure Assessment. Multimedia exposure assessment; exposure modeling; ambient and indoor air pollution; study design.

Ning Wang, MS (Huazhong University of Science and Technology), SD (Harvard University); Assistant Professor of Physiology and Cell Biology. Cytoskeletal mechanics; mechanochemical signal transduction; cell adhesion and migration; cancer metastasis; effects of mechanical forces on cells.

Xiping Xu, MD (Anhui Medical University, China), PhD (University of Tsukuba, Japan), SM (Harvard University); Associate Professor of Occupational Epidemiology (Environmental Health and Epidemiology); Associate Professor of Medicine, Harvard Medical School. Environmental, occupational, and genetic epidemiology of respiratory, cardiovascular, and metabolic diseases.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Robert B. Banzett, PhD (University of California, Davis); Associate Professor in the Department of Environmental Health. Respiratory neurophysiology and mechanics; perceived sensation; control; interaction with locomotion; fluid dynamics in the avian lung.

Harold A. Chapman, Jr., MD (University of Alabama); Associate Professor in the Department of Environmental Health. Pathophysiology of chronic inflammatory reactions in the lung; biology of proteases and antiproteases; role of coagulation and fibrinolysis in the pathogenesis of acute lung injury.

injury. Physicians interested in occupational and environmental medicine may apply either to the MOH program or to the Occupational and Environmental Health concentration of the Master of Public Health (MPH) program (see page 10). Either the MOH or the MPH is taken as the first year of a two-year Occupational and Environmental Medicine Residency (see page 31).

Core course requirements for the MOH (or the MPH) are as follows: BIO 200, *Principles of Biostatistics*; EH 243, *Ergonomics/Human Factors*, or EH 241, *Occupational Safety*; EH 262, *Introduction to the Work Environment*; EPI 200, *Principles of Epidemiology*; HSB 201, *Society and Health* (or alternate); CCE 204, *Principles of Toxicology*; EH 231, *Occupational Health Policy and Administration*; EH 232, *Introduction to Occupational and Environmental Medicine*; EHE 215, *Environmental and Occupational Epidemiology*; and ID 263, *Practice of Occupational Health*. Recommended electives include either BIO 210, *The Analysis of Rates and Proportions*, or BIO 211, *Regression and Analysis of Variance in Experimental Research*. MOH students may also choose to take ID 250, *Ethical Basis of the Practice of Public Health*, which is required by the MPH program. Also recommended is MIT course 10.805J, *Technology, Law, and the Working Environment*.

Master of Science in Environmental Health

Occupational Health Concentration

Occupational Safety and Health emphasizes the epidemiologic and biostatistical aspects of this field. The program is normally completed over four semesters, although an individual with a PhD or JD may be admitted to a two-semester program. It is generally expected that students without a prior doctoral degree will wish to enroll in a subsequent doctoral program.

Applicants normally have a bachelor's degree and advanced training in science, including college-level organic and inorganic chemistry. Those currently holding positions in the field of occupational safety and health who plan to return to these positions are considered particularly strong candidates for admission. Some financial support may be available for US citizens or permanent residents through traineeships or National Research Service Awards.

Doctor of Science in Environmental Health/Doctor of Public Health

Occupational Health Concentration

An SD or DPH degree may be earned by students who wish to concentrate in Occupational Health. Students may also wish to pursue additional training opportunities through the occupational epidemiology and/or environmental molecular epidemiology areas of interest described on page 35. Students fulfill course requirements in one major (20 credits) and two minor fields (10 credits each). In addition, they must pass a written departmental comprehensive examination, pass the school-wide oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and complete, defend, and submit a thesis.

PHYSIOLOGY

The concentration in Physiology focuses on normal and pathological functions of organisms. It centers on the respiratory system because the system presents an immense, thin surface area to the environment, and thus is an important route of entry to the body as well as a site of damage from toxins and infections. Areas of study include mediators and adhesion molecules involved in inflammation; the effects of inhaled particles; lung infections; biomechanics of cells and tissue in normal and inflamed lungs; smooth muscle function in asthma; control of breathing; sleep-related breathing disorders; mechanisms of dyspnea and respiratory sensations; cardiovascular pathobiology; and epithelial cell, macrophage, lymphocyte, and neutrophil lung biology. The biology is broadly based, ranging from molecular and cell biology to integrated organismic, environmental, and comparative physiology.

The Physiology concentration integrates a range of scientific disciplines, including physics, bioengineering, physiology, biomathematics, cell biology, molecular biology, clinical science, and epidemiology. By working within this rich interdisciplinary environment, students learn many measurement technologies, discover a variety of disciplinary approaches, and develop mature scientific thinking. Special facilities are available, including a confocal microscope, analytical electron microscopes, a flow cytometer, a sleep laboratory, and a sensation laboratory.

As described below, the concentration in Physiology leads either to the Doctor of Philosophy (PhD) degree, offered through the Biological Sciences in Public Health program under the auspices of the Graduate School of Arts and Sciences, or the Doctor of Science (SD) degree, offered through the Department of Environmental Health. Areas of interest in both programs are as follows: Cell and Molecular Biology of the Lungs, Pathogenesis of Lung Disease, Respiratory Physiology, Ergonomics and Safety, Bioengineering, and Infectious Diseases.

Doctor of Philosophy in Biological Sciences in Public Health (BPH)

Physiology Concentration

Students wishing to study cellular and molecular biology or physiology as it pertains to major problems in public health may apply to the PhD program in the Biological Sciences in Public Health (BPH). This program offers the PhD degree through Harvard University's Graduate School of Arts and Sciences.

The program is designed to prepare students for research careers in respiratory physiology, cell and molecular biology, or bioengineering. It offers a firm foundation in the basic biomedical sciences, as well as in epidemiology and biostatistics. Specific courses supplement this core, as dictated by individual research concentrations. Students in this program engage in laboratory rotations in three different research areas to enable them to assess realistically their interests in a thesis project and to evaluate the suitability of the laboratory and the mentor. At the completion of these rotations, students select an area of concentration and a thesis research laboratory and complete the required curriculum. A qualifying examination must be passed before engaging in thesis work, and the thesis must be defended before the granting of the PhD.

Doctor of Science in Environmental Health

Physiology Concentration

Students wishing to study cellular, integrative, or engineering approaches as they pertain to problems in the environment, in physiology, or, public health may apply directly to the Doctor of Science (SD) program in the Department of Environmental Health. Like the PhD program, the SD program is designed to prepare students for research careers in respiratory physiology, cell and molecular biology, or bioengineering. The program offers a firm foundation in the basic biomedical sciences, as well as in epidemiology and biostatistics, and provides the opportunity for students to engage in laboratory rotations.

Students in the SD program must pass the school-wide oral qualifying examination, must adhere to the doctoral timetable for maintaining satisfactory progress, and must complete, defend, and submit a thesis based on intensive research under the guidance of a faculty advisor in the student's area of concentration.

Applicants to the PhD or SD programs generally have a bachelor's degree and demonstrated competence in organic and biological chemistry, general biology, physics, and calculus. Those deficient in one of these areas may be admitted provisionally on the condition that appropriate courses will be taken before and/or after entering the program. Applicants must take both the GRE general and subject tests by October in order to meet the application deadline of December 15.

Most students admitted to the program receive a stipend, as well as tuition and health insurance support. Students are encouraged to apply for fellowships from

For more information about research and training in Physiology, please contact Jeffrey J. Fredberg, SMME, ME, PhD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0198
Fax: 617-432-3468
E-mail: jfredber@hsph.harvard.edu

For application materials and information about admission to the PhD program, please contact the Graduate School of Arts and Sciences Admissions Office, Harvard University, 8 Garden Street, Cambridge, MA 02138.
Phone: 617-495-5315

Applicants who have specific questions about the PhD program may contact Ruth Kenworthy, Administrator, Division of Biological Sciences, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2932
Fax: 617-432-4098
E-mail: kenworthy@cvlab.harvard.edu

Jeffrey M. Drazen, MD (Harvard University); Professor in the Department of Environmental Health. Pulmonary and respiratory pharmacology; mediators of immediate hypersensitivity; mucus regulation and expression in chronic bronchitis.

John J. Godleski, MD (University of Pittsburgh); Associate Professor in the Department of Environmental Health. Experimental models of normal and pathologic responses to inhaled particles.

Diane R. Gold, MD (University of Connecticut), DTM&H (University of Liverpool), MPH (Harvard University); Assistant Professor in the Department of Environmental Health. Acute lower respiratory illness in childhood as a predictor of lung function and chronic respiratory symptoms; the relationship between indoor/outdoor air pollution and childhood respiratory morbidity; socioeconomic and environmental predictors of asthma prevalence and severity.

Rose H. Goldman, MD (Yale University), MPH, SM (Harvard University); Assistant Professor in the Department of Environmental Health. Occupational health in the biotechnology industry; metal poisoning; neurotoxicity; cumulative trauma injuries.

Stefanos N. Kales, MD, MPH (Harvard University); Assistant Professor in the Department of Environmental Health. Occupational/environmental lung disease; occupational/environmental toxicology.

Lester Kobzik, MD (Tufts University); Associate Professor in the Department of Environmental Health. Lung macrophage phagocytosis and response to inhaled particles; pulmonary inflammation and pathology.

Stephen H. Loring, BMS (Dartmouth Medical School), MD (Harvard University); Associate Professor in the Department of Environmental Health. Chest wall mechanics, hyperinflation, and lung transplantation; mechanics and physiology of respiratory muscles and the pleural space.

Steven A. Shea, PhD (University of London); Assistant Professor in the Department of Environmental Health. Control of breathing, respiratory sensations, and sleep physiology in humans.

George P. Topulos, MD (University of Massachusetts); Assistant Professor in the Department of Environmental Health. Pulmonary micromechanics and pulmonary circulation.

Richard Verrier, PhD (University of Virginia); Associate Professor in the Department of Environmental Health. Neural triggers of sudden cardiac death; cardiac electrophysiology; T-wave alternans; coronary hemodynamic function; novel delivery systems for antiarrhythmic therapy.

Scott T. Weiss, MD (Case Western Reserve University), SM (Harvard University); Professor in the Department of Environmental Health. Natural history of chronic lung disease; epidemiology of asthma and hyptertension; cardiovascular, occupational, environmental, and genetic epidemiology; the effect of aging on pulmonary function.

Adjunct Faculty

Ellen A. Eisen, SM, SM, SD; Professor of Work Environment, University of Massachusetts, Lowell.

Alan Eschenroeder, BME, PhD; private consultant.

Rokho Kim, MD, MPH, DPH, PhD; Assistant Professor, Seoul National University.

Nancy C. Long, PhD; Assistant Professor, Division of Science and Mathematics, Boston University College of General Studies.

outside sources since certain external fellowships provide higher stipends. While funds to support international students are limited, one special scholarship is available each year for a student from a developing, sub-Saharan African country. There is also a university-wide fellowship program that provides funding to qualified underrepresented minority students in the sciences.

Graduates ordinarily assume positions as faculty members and research scientists at medical schools, research institutes, and schools of public health. Career opportunities in the biological sciences as they apply to public health are expected to grow both in academia and in the biotechnology and pharmaceutical industries.

Courses Offered by the Department of Environmental Health, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

EH 201b. Introduction to Environmental Health (J. Brain)
Analyzes health problems stemming from contamination of air, water, food, the workplace, and other special environments. Examines policy required for regulation and strategies for prevention and control. (2.5 credits)

EH 202d. Principles of Environmental Health (R. Monson)
Focuses on the assessment of risk to health from environmental exposures, the use of such data in policy development and environmental management, and legal strategies for redressing environmental injury and controlling environmental degradation. (2.5 credits)

EH 205ab. Human Physiology (R. Banzett)
Introduces the function of the human organism. Emphasizes the concept of homeostatis and the integrative aspects of physiology. Includes some pathophysiology. (5 credits)

EHE 215. Environmental and Occupational Epidemiology
EHE 215cd. (D. Dockery, R. Hauser)
EHE 215t. (D. Dockery, R. Hauser)
Reviews methods used to evaluate the health effects of exposure to physical and chemical agents in the environment and presents policy questions raised by the scientific evidence. Topics include methodology, review and criticism of current literature, and specific environmental and occupational health issues of current interest. (2.5 credits)

EH 223ab. Advanced Respiratory Physiology (J. Butler)
Covers lung structure, volume and flow mechanics, surfactant function, gas exchange, and lung and chest-wall interaction. Presents classic concepts and recent advances. (5 credits)

EH 225cd. Advanced Topics in Physiology (J. Fredberg, J. Paulauskis)
Allows students to focus on special topics in lung biology. The topic for 1999-2000 is the physical basis and quantitative description of chemical, electrical, and mechanical signaling within the cell. (5 credits)

EH 231cd. Occupational Health Policy and Administration (R. Monson, C. Langer)
Examines legal, economic, and political foundations of occupational health activities in the US. Discusses roles of government, unions, research organizations, and corporations. (2.5 credits)

EH 232cd. Introduction to Occupational and Environmental Medicine (H. Hu, D. Christiani)
Reviews diagnosis following exposure to specific workplace substances, including asbestos, lead, and organic solvents. Presents techniques for assessing disability. (2.5 credits)

EH 235ab. Scientific Basis of Occupational Health Regulations (E. Eisen, D. Wegman)
Reviews the scientific basis for the association of occupational exposures and disease. Emphasizes the evaluation of epidemiologic literature, the interface of science and regulatory policy, and the role of risk analysis in setting health standards. (5 credits)

EH 241cd. Occupational Safety (A. Mangone, T. Smith)
Covers principles of occupational safety, including safety regulation and standards, models of accident causation, investigation procedures, and techniques for accident control. (2.5 credits)

EH 243ab. Ergonomics/Human Factors (R. Herrick, T. Courtney, V. Ciriello)
Emphasizes the design of the job to fit the worker. Investigates specific problems resulting from the nature of the job itself and considers the physiological, biomedical, psychological, and anatomical characteristics of the worker in the development of good job design principles. (2.5 credits)

Course listings continue on page 36.

ADDITIONAL AREAS OF INTEREST

The Department of Environmental Health offers these areas of interest to provide additional, in-depth research and training opportunities.

Environmental Molecular Epidemiology

Occupational Health Concentration

This area is for those students interested in the application of molecular methods to environmental epidemiologic studies for the measurement of exposure, disease susceptibility, or disease outcome. This area of interest has a curriculum based in occupational and environmental health and augmented by the study of biomarkers, epidemiologic methods, physiology, cancer biology, exposure assessment, and molecular biology.

Occupational Epidemiology

Occupational Health Concentration

Students who are interested in the epidemiology of occupational disease and injury may elect to pursue training in this area by applying themselves to a curriculum that includes courses in epidemiology, exposure assessment, occupational health, biostatistics, toxicology, and molecular biology. This area has an emphasis on the application of biomarkers to occupational health and in statistical modeling of exposure-response relationships.

Ergonomics and Safety

Environmental Science and Engineering Concentration

This specialty area provides a public health and engineering approach to the control and evaluation of occupational hazards for the prevention of work-related musculoskeletal injury and illness. The curriculum prepares graduates to identify and evaluate ergonomic and safety risks in the workplace; identify and evaluate the occurrence of work-related musculoskeletal injury and illness; develop administrative and engineering controls in the design of equipment, work tasks, and workplaces; and develop and evaluate policies and programs for the prevention of musculoskeletal injuries and illnesses.

Population Genetics

Occupational Health and Environmental Epidemiology Concentrations

This is a multidisciplinary field, integrating aspects of genetics, epidemiology, statistics, biology, and medicine. Complex diseases such as asthma, cancer, diabetes, hypertension, neurological disorders, and coronary heart disease are considered, utilizing genetic data from human populations and families. Students who pursue this area of interest participate in broad-based, comprehensive research which includes gene-mapping to identify the genetic loci and variants responsible for the genetic contribution to complex disease; studies of gene-environment interaction to investigate the relative contributions of genetic and environmental factors in disease manifestation; mutation and allele frequency studies to investigate the distribution of disease-predisposing factors in the population at large; gene assessment to investigate the role of a particular (candidate) gene in disease pathogenesis; and clinical trials to confirm pharmacological intervention and public health prevention.

Water Pollution

Environmental Science and Engineering and Environmental Epidemiology Concentrations

This area is designed for those interested in seeking in-depth training in water quality issues, including transmission of waterborne disease, toxicological concerns, and water and wastewater treatment strategies. Faculty research interests include survival and proliferation of pathogens in drinking water, microbial interactions with pollutants, pollutant fate and transport in aquatic ecosystems, and toxicity of disinfection by-products. International issues, especially those of developing countries, are emphasized. In addition to general core requirements the recommended curriculum includes courses at HSPH, MIT, and in Harvard's Faculty of Arts and Sciences and Kennedy School of Government.

Interdisciplinary Program in Molecular Epidemiology

A doctoral program is available in this department through the Interdisciplinary Program in Molecular Epidemiology. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, genetics, exposure assessment, and epidemiology. For more information on this program, see page 6.

Interdisciplinary Program in Infectious Disease

Education and research on infectious disease are available through the Interdisciplinary Program in Infectious Disease. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, quantitative methods, and infectious disease. For more information on this program, see page 6.

For more information about research and training in Environmental Molecular Epidemiology, please contact Karl T. Kelsey, MD, MOH, Departments of Cancer Cell Biology and Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3313
Fax: 617-432-0107
E-mail: kelsey@hohp.harvard.edu

For more information about research and training in Occupational Epidemiology, please contact David C. Christiani, MD, SM, MPH, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1260
Fax: 617-432-0219
E-mail: dchris@hohp.harvard.edu
www: www.hsph.harvard.edu/erc

For more information about research and training in Ergonomics and Safety, please contact Jack T. Dennerlein, SM, PhD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2028

For more information about research and training in Population Genetics, please contact Xiping Xu, MD, PhD, SM, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2959
Fax: 617-432-2956
E-mail: xxu@hohp.harvard.edu

For more information about research and training in Water Pollution, please contact Timothy E. Ford, PhD, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3434
E-mail: ford@deas.harvard.edu

Lucas M. Neas, MSE, SD; Health Scientist, US Environmental Protection Agency.

Robert B. Pojasek, PhD; Senior Scientist and Senior Program Manager, Cambridge Environmental, Inc.

P. Barry Ryan, SM, PhD; Professor of Environmental Health, Emory University.

Peter A. Valberg, AM, SM, PhD; Cambridge Environmental, Inc.

David H. Wegman, MD, SM; Professor and Chair, Department of Work Environment, University of Massachusetts, Lowell.

Yukio Yanagisawa, MEng, DEng; Professor, Tokyo University, and Chief Researcher, Research Institute for Innovative Technology on Earth.

EH 250cd. Protecting Workers from Hazardous Substances (S. Rudnick, M. Walters)
Covers the recognition, evaluation, and control of workers' exposure to chemical and physical agents during remediation of hazardous sites, emergency response activities, and related operations. (2.5 credits)

EH 253cd. Ventilation and Indoor Air Quality (S. Rudnick, J. Spengler, L. DiBerardinis)
Covers industrial ventilation to control workers' exposure to airborne contaminants, HVAC systems, and indoor environmental quality assessment of buildings and residences. (5 credits) Not offered 1999-2000.

EH 254cd. Evaluation and Control of Noise and Vibration (S. Rudnick)
Covers the fundamentals, principles, evaluation, and control of noise and vibration. (2.5 credits)

EH 256cd. Introduction to Aerobiology (H. Burge, D. Milton, M. Muilenberg)
Emphasizes the microbiology of the air, including the nature of organisms producing aerosols, the nature of aerosols and the dynamics of aerosol populations, and exposure assessment issues. (2.5 credits)

EH 257cd. Water Pollution (T. Ford, J. Shine)
Presents the basic principles of water pollution and related issues on local, regional, and global scales. Discusses the chemical, physical, and biological properties of water and contaminants in ground, surface, brackish, and marine waters. (5 credits) Not offered 1999-2000.

EH 262ab. Introduction to the Work Environment (R. Herrick)
Covers key aspects of industrial hygiene, including recognition, evaluation, and control of health hazards at work. Considers chemical, physical, and biological hazards, and the criteria for each. Includes one or more workplace visits. (2.5 credits)

EH 263cd. Analytical Chemistry and Exposure Assessment (J. Shine, H. Suh, Y. Yanagisawa)
Emphasizes first water and then air, requiring students to design and implement field investigations to assess human exposures to environmental pollutants in occupational or community settings. (5 credits)

EH 264cd. Water Environment (J. Harrington)
Provides students with an understanding of water engineering principles, emphasizing design and treatment of water supply systems in developing and developed countries. (2.5 credits)

EH 266cd. Land Environment and Waste Management (M. First)
Focuses on the nature, sources, and amounts of municipal, industrial, and hazardous wastes; laws governing storage, environmental control, transport, and disposal; waste management, minimization, elimination, recycling, and intermedia transfers, ground to water and ground to air. (2.5 credits) Not offered 1999-2000.

EH 267cd. Industrial Hygiene/Ergonomics Internship and Environmental Sciences Research Seminar (R. Herrick, P. Koutrakis)
Refines communication skills of students who have participated in the Industrial Hygiene Internship (EH 273ab). (2.5 credits)

EHE 268b. Respiratory Epidemiology (D. Dockery)
Reviews the epidemiology of chronic respiratory diseases; discusses demographic distribution, time trends, and risk factors. (1.25 credits)

EH 269cd. Exposure Assessment for Environmental and Occupational Epidemiology (T. Smith, H. Suh)
Reviews methods used to characterize environmental and occupational exposures. Introduces approaches for matching biologically based exposure assessment to epidemiologic designs. (2.5 credits)

EH 270cd. Principles of Pollution Prevention (R. Pojasek, J. Spengler)
Students work in groups to learn to apply creative problem-solving techniques to the prevention of pollution. Students learn how to prepare a process map and use it as a template for tracking material use and loss. (5 credits)

EEB 271c. Advanced Regression Techniques for Environmental Epidemiology (J. Schwartz, L. Ryan)
Covers nonlinear exposure-response relationships and repeated measure designs, including smoothing techniques, generalized additive models, robust regression, and time series models. Students use data sets to model effects of exposures on health outcomes. (2.5 credits)

EH 273ab. Industrial Hygiene Internship (R. Herrick)
Places students in an industrial or similar workplace under the direction of an experienced industrial hygienist to learn evaluation techniques and to study a specific hazard or problem. (20 credits)

EHE 277b. Modern Genetic Epidemiology and Gene Mapping (X. Xu)
Provides a comprehensive review of epidemiologic methods and study designs, family and sib pair ascertainment, gene mapping technologies, computer software, data analysis, and interpretation. Explores innovative approaches for mapping genes of complex human diseases and addresses genetic issues underlying common human diseases. (2.5 credits)

EH 278ab. Human Health and Global Environmental Change (H. Hu, E. Chivian, P. Epstein)
Provides an overview of the basic physics, chemistry, and biology of global environmental change, and of the potential consequences of these changes for human health. Topics include climate change, stratospheric ozone depletion, effects of toxic sub-

stance pollution on global ecosystems, the degradation of terrestrial and marine environments, and the loss of species and biodiversity. (5 credits)

EH279cd. The Radiation Environment: Its Identification, Evaluation, and Control (A. Aro, J. Shapiro)
Introduces the physics, mathematical analysis, and control of radiation fields before addressing topics selected according to the specific interests of the students. Past topics have included radiotherapy, medical imaging (x-rays, magnetic resonance, ultrasound), occupational and environmental radiation protection (radon, microwaves, ultra-violet radiation, electric and magnetic fields), and use of radiation as an analytical tool (bone-lead measurements, bone density, neutron activation analysis). (2.5 credits)

EHE 280cd. Biomarkers in Occupational and Environmental Health (K. Kelsey, D. Christiani)
Covers the use of biomarkers as measures of exposure, absorbed dose, biological effect, and health outcome in acute and chronic disease states. (2.5 credits) Not offered 1999-2000.

EHB 281a. The Genetic Basis of Human Disease (J. Rogus, A. Doria)
Introduces basic concepts of genetics and molecular biology necessary for understanding the genetic basis of disease. Covers two main topics: molecular biology and genetic epidemiology, with additional case studies. (2.5 credits)

EH 290. Research in Physiology (J. Fredberg, J. Brain, J. Godleski)
Focuses on the design, conduct, and analysis of research in physiology. Includes laboratory experience and the acquisition of original data. Culminates in the presentation of a research project at a national meeting and in the preparation of a paper suitable for publication. (2.5 credits)

EH 292c. Air Pollution: Properties of Gases and Particles (S. Rudnick)
Covers the laws of ideal and real gases, gas properties, and application of aerosol properties to particle sampling, sizing, and collection. Topics include particle formation and deposition mechanisms, respiratory sampling, and instrumentation for sizing and measuring airborne particles in the atmosphere. (2.5 credits)

EH 295d. Air Pollution: Atmospheric Processes, Modeling, and Energy (Y. Yanagisawa, D. Jahng)
Employs thermodynamics theory to organize understanding of kinetics, chemical reactions, and equilibrium of air pollutants as taught in previous air pollution courses. Topics include the first and second laws of thermodynamics, chemical potential, and equilibrium. (2.5 credits)

EHH 500a. Risk Assessment (J. Evans, J. Hammitt)
Introduces risk assessment's framework and foundations, including epidemiology, toxicology, and exposure assessment. Considers the relationship of risk assessment with cost-benefit, decision analysis, and other tools for improving environmental decisions. Discusses mathematical sciences used to develop models of dose-response, fate and transport, and the statistical aspects of parameter estimation and uncertainty analysis. (2.5 credits)

EHH 501b. Regulatory Toxicology (L. Rhomberg)
Covers basic principles of toxicology and ways animal and human studies are used to further the understanding of dose-response relationships. Presents the toxicological evidence for regulating chemicals in the environment and food supply, and quantitative pharmacokinetic and dose-response models used in risk assessment. (2.5 credits)

EHH 502d. Environmental Pollution: Exposure Modeling (J. Evans, A. Eschenroeder)
Presents approaches for estimating human exposure to environmental pollution in situations where measurements are unavailable or uninformative. Focuses on models of the fate and transport of pollutants in air, water, and soil, and considers the major routes of uptake: inhalation, ingestion, and dermal uptake. Models discussed typically include the Gaussian air pollution model, one-dimensional advection-dispersion models of groundwater, multicompartment models such as fugacity and pharmacokinetic models, and source-receptor models. (2.5 credits) Not offered 1999-2000.

EHH 503ab. Environmental Science and Risk Management Practicum (ESRM) (J. Evans)
Allows ESRM students to integrate what they have learned about risk and decision sciences and to apply this knowledge in the evaluation of a problem in environmental management or policy. Students design and conduct an independent analysis of an environmental policy problem, demonstrating analytical sophistication and critical interpretation of relevant science in support of decision making. Required for all students in ESRM master's and doctoral programs. (5 credits)

Independent Study, Field Experience
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or to undertake specialized readings or studies in the following areas: aerosol technology, air pollution control, environmental health management, environmental epidemiology, environmental microbiology, industrial hygiene and ventilation, nuclear medicine, occupational medicine, radiological health, respiratory biology, respiratory epidemiology, and solid waste management. Supervised site visits and field research projects are available in medical, industrial hygiene, and environmental health departments of industries and governmental agencies.

Megan Murray
Doctoral Student
Department of Epidemiology

Prior to coming to HSPH, Megan Murray worked in a Thailand refugee camp, where she screened individuals for tuberculosis (TB), a disease common among Asian and African populations. TB is the leading cause of death by infectious disease in the world.

In recent years, TB has gained attention from the international health care community because of its connection to HIV and other infectious diseases. In the US, "there is fear that the large numbers of TB cases found in other countries may begin to be seen here. Health professionals recognize our vulnerability to TB and are cautiously afraid," she says.

Murray also contributes her time to local clinics where infectious diseases are commonly seen. The mother of two and expecting, Murray coordinates research and studies with many responsibilities. "Compared to the rigorous demands of medical school, this is manageable!" she laughs, adding, "It's still difficult, but being a mother keeps it all in perspective."

Epidemiology is the study of the frequency, distribution, and determinants of disease in humans, and is one of the fundamental sciences of public health. While individual epidemiologists have different study objectives and use different approaches, the aims of epidemiologic research ultimately lie in the prevention or effective control of human disease.

The Department of Epidemiology has a long tradition of teaching and research in the epidemiology of cancer, cardiovascular disease, and other chronic diseases, as well as in epidemiologic methodology. Current research in the department includes the role of viruses in the etiology of cancer; the connection between diet and risk of cancer, cardiovascular disease, and other major chronic diseases; the relationship between exposure to chemicals in the workplace and the development of cancer; the epidemiology of infectious disease; factors in early life predisposing individuals to chronic diseases; case identification and risk factors in mental disorders; health effects of drugs, vaccines, and medical devices; and causes of human infertility.

Recent graduates have become members of the faculties of major universities, medical schools, and research institutes. They also serve as epidemiologists for the National Cancer Institute, Centers for Disease Control and Prevention, and other domestic and international governmental institutions, as well as in private industry.

The department offers a two-semester and a four-semester Master of Science (SM) program, as well as a Doctor of Science (SD) and a Doctor of Public Health (DPH) program. Students pursuing these degrees choose among the following areas of interest:

Cancer Epidemiology

In addition to research methodology, the curriculum in this area includes courses on the biology and genetics of cancer; the basic concepts and issues of cancer epidemiology; the roles of diet, oncogenic viruses, and occupational exposures in the etiology of cancer; the integration of biomarkers into research; the prevention of cancer; and research methods. Research opportunities for students include a large number of ongoing cohort and case-control studies within the department and in conjunction with the Dana-Farber/ Harvard Comprehensive Cancer Center. Financial support may be available for US citizens or permanent residents enrolled in a doctoral degree program or postdoctoral fellowship program in cancer epidemiology.

Cancer Prevention

This area provides students with a knowledge of the science of cancer prevention, expertise in a specialized research area, skill in policy analysis, and an introduction to professional networks through which they will be able to update continuously their knowledge of this evolving field. Social and behavioral scientists enrolled in the program prepare themselves to advance knowledge of the efficiency and effectiveness of alternative strategies for inducing behavioral change at the individual, institutional, community, or policy levels. Physicians prepare themselves for careers as clinical investigators or public health practitioners specializing in cancer prevention. The program combines the interdisciplinary resources of the Harvard Center for Cancer Prevention and of the Division of Cancer Epidemiology and Control in the Dana-Farber Cancer Institute.

Financial support may be available through the National Cancer Institute for doctoral students and postdoctoral fellows and for physicians engaged in postdoctoral training. Candidates for financial support must be US citizens or permanent residents.

Cardiovascular Epidemiology

This area provides training in research methodology and the epidemiology of cardiovascular diseases. Doctoral students conduct research in a substantive or methodological area related to cardiovascular epidemiology. Research traineeships may be available through Harvard Medical School for students interested in cardiovascular disease or aging; candidates must be US citizens or permanent residents who are enrolled in a degree program in epidemiology.

Clinical Epidemiology

This area is designed primarily for clinicians and other health care professionals who wish to develop the quantitative and analytic skills needed for clinical research. Students take core courses in epidemiology and biostatistics to develop basic skills in study design and analysis that will allow them to examine clinical questions related to the diagnosis and treatment of disease. Additional courses in epidemiology and courses offered by other departments address related topics such as health status and quality of life measurement, decision analysis, cost-effectiveness analysis, health services research, and quality improvement of health care.

While the appropriate content for this area may be covered by taking courses offered during the regular academic year (fall and spring semesters), requirements for the two-semester Master of Science (SM) degree may also be partially fulfilled by taking the summer courses offered through the Program in Clinical Effectiveness (see page 83). Clinical Effectiveness students begin their program by taking a core set of courses during an initial summer period. They complete the program by taking advanced courses during the regular academic year and, if desired, during a second summer period. Alternatively, Clinical Effectiveness students who only take courses during two summer periods can satisfy the requirements for this degree by completing a supervised research project. The content of this project typically entails the design and implementation of a clinical study, the analysis of the resulting data, and the creation of a manuscript of suitable quality for publication. An outline for this project must be submitted at time of application.

Environmental/Occupational Epidemiology

This area is closely associated with the concentrations in Environmental Epidemiology and Occupational Health in the Department of Environmental Health. Students take courses in epidemiology, environmental health, occupational health, biostatistics, and toxicology. Doctoral students conduct research in a substantive or methodologic area related to environmental or occupational health.

Financial assistance may be available for individuals who plan to pursue research and teaching careers in environmental and/or occupational epidemiology. Candidates for

For more information about research and training in Cancer Epidemiology, please contact Nancy E. Mueller, SD, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4576
Fax: 617-566-7805
E-mail: nmueller@epinet.harvard.edu

For more information about research and training in Cancer Prevention, please contact Graham A. Colditz, MB, BS, DPH, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-525-2754
Fax: 617-525-2008
E-mail: graham.colditz@channing.harvard.edu

For more information about research and training in Cardiovascular Epidemiology, please contact Meir J. Stampfer, MD, DPH, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-525-2747
Fax: 617-525-2008
E-mail: meir.stampfer@channing.harvard.edu

For more information about epidemiology research traineeships in cardiovascular disease or aging, please contact Julie E. Buring, SD, 900 Commonwealth Avenue East, Boston, MA 02215.
Phone: 617-732-4965

For more information about research and training in Clinical Epidemiology, please contact E. Francis Cook, SD, Section on Clinical Epidemiology, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115.
Phone: 617-732-5650
E-mail: fran@clinepi.bwh.harvard.edu

For more information about research and training in Environmental/Occupational Epidemiology, please contact David C. Christiani, MD, SM, MPH, Department of Environmental Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1260
Fax: 617-432-0219
E-mail: dchris@hohp.harvard.edu

For more information about research and training in Epidemiologic Methods, please contact James M. Robins, MD, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0206
Fax: 617-566-7805
E-mail: robins@epinet.harvard.edu

For more information about programs or courses relating to Infectious Diseases, please contact Jonathan Freeman, MD, SD, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4558
Fax: 617-566-7805
E-mail: jfreeman@hsph.harvard.edu

For more information about research and training in Molecular Epidemiology, please contact David J. Hunter, MB, BS, SD, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-525-2755
Fax: 617-525-2718
E-mail: david.hunter@channing.harvard.edu

For more information about research and training in Oral and Dental Health Epidemiology, please contact Chester W. Douglass, DMD, PhD, Harvard School of Dental Medicine, 188 Longwood Avenue, Boston, MA 02115.
Phone: 617-432-1456
Fax: 617-432-0047
E-mail: cdoug@warren.med.harvard.edu

Faculty

Department Chair: Alexander M. Walker, MD, MPH, DPH (Harvard University); Henry Pickering Walcott Professor of Epidemiology. Pharmacoepidemiology; study design for observational research.

Alberto Ascherio, MD (University of Milan), Diploma (London School of Hygiene and Tropical Medicine), MPH, DPH (Harvard University); Assistant Professor of Nutrition and Epidemiology. Relation of dietary factors to the occurrence of human disease.

these traineeships must be US citizens or permanent residents enrolled in a doctoral program or postdoctoral fellowship program in epidemiology, environmental health, or occupational health.

Epidemiologic Methods

This area provides training in the development and application of new methods in epidemiologic research. Through courses offered by the Department of Epidemiology, students learn to use and justify classical epidemiologic methods in study design, data analysis, and interpretation of results. Through courses offered by the Department of Biostatistics, students receive training in biostatistical areas most relevant to epidemiologic research. Through advanced course work and tutorials, students are introduced to recent innovations in epidemiologic methodology. Doctoral students conduct research with faculty specializing in the development of new methodologies and in novel applications of existing methodologies to important data sets in epidemiology. Students enrolling in this area of interest ordinarily have completed four semesters of college calculus and one semester of linear algebra.

Infectious Diseases

This area is designed to familiarize students with the epidemiology and biology necessary to understand the interactions of infectious agents, their hosts, and their vectors. Social and cultural aspects of infectious diseases and of related health services are covered, as are new and resurgent infectious diseases. Students in this area take courses in the departments of Epidemiology, Immunology and Infectious Diseases, and Population and International Health. More advanced topics of infectious disease epidemiology are covered in tutorials with faculty specializing in this area.

Molecular Epidemiology

This area introduces students to the application of molecular methods to epidemiologic studies. These methods may be useful as measures of exposure, disease susceptibility, or disease outcome. A range of relevant courses are available, as are research opportunities, particularly in association with the Department of Environmental Health, the Dana-Farber Cancer Institute, and the Joslin Diabetes Clinic.

Interdisciplinary Program in Infectious Disease

Doctoral-level educational and training opportunities relating to infectious disease are available through the Interdisciplinary Program in Infectious Disease. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, quantitative methods, and infectious disease. For more information on this program, see page 6. Master's-level students may follow the departmental track in infectious diseases.

Interdisciplinary Program in Molecular Epidemiology

A doctoral program is available in this department through the Interdisciplinary Program in Molecular Epidemiology. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, genetics, exposure assessment, and epidemiology. For more information on this program, see page 6.

Oral and Dental Health Epidemiology

This area prepares dentists and others interested in oral diseases for research and teaching careers in epidemiology with an emphasis on oral epidemiology and dental health. A new area of emphasis is the relationship between oral conditions, nutrition, and systemic diseases such as coronary heart disease, stroke, and cancer. Students follow the required curriculum in epidemiology with additional course work in oral biology and the epidemiology of oral and dental diseases. Students also participate in field research activities, case-control studies of oral health risk factors, or clinical trials

designed to test preventive, diagnostic, or therapeutic interventions. Funding may be available for US citizens or permanent residents enrolled in the doctoral program. This area of interest is jointly administered by the Department of Oral Health Policy and Epidemiology in the Harvard School of Dental Medicine and the HSPH Department of Epidemiology.

Pharmacoepidemiology

This area is designed for those interested in studying the frequency and determinants of both unintended and expected effects of drugs and medical devices. Studies of the pattern of utilization of drugs and devices, cost-benefit and risk-benefit analyses, and investigation of the distribution of diseases possibly amenable to medical intervention represent important secondary themes. The Department of Epidemiology offers an intermediate-level course in pharmacoepidemiology and a variety of ongoing research projects. Relevant courses elsewhere in the school cover such areas as clinical trials, meta-analysis, drug regulatory affairs, decision analysis, and vaccine development. Students in pharmacoepidemiology have the opportunity to attend courses and congresses outside the school and are encouraged to undertake internships of up to three months in pharmaceutical firms or regulatory agencies. Students ordinarily have a prior degree in medicine or pharmacy. Others are expected to acquire substantially equivalent expertise in areas related to their research. Financial support may be available for doctoral students pursuing thesis research.

Psychiatric Epidemiology

This area introduces students to concepts and methods for studying the genetic and psychosocial factors that relate to the prevalence, incidence, and outcome of different types of psychiatric illnesses. Emphasis is given to issues of reliability and validity in studying such disorders among children, adolescents, and adults. The curriculum consists of six specialized courses as well as related courses offered in the Departments of Epidemiology, Biostatistics, Maternal and Child Health, and Health and Social Behavior. Funding may be available through the National Institute of Mental Health for doctoral and postdoctoral traineeships in epidemiologic and statistical methods as applied to the study of psychiatric disorders; eligible students typically hold degrees in medicine, biology, psychology, sociology, or quantitative methods, and must be US citizens or permanent residents.

Women, Gender, and Health

HSPH offers a number of courses relating to women, gender, and health. For more information, see page 7.

Master of Science in Epidemiology (four-semester program)

The master's programs provide students with basic skills in epidemiologic and quantitative methods and in computing, in preparation for research or academic careers. The four-semester (80-credit) SM program is designed for individuals who hold a bachelor's degree and have a strong background in biology and mathematics. In addition to epidemiology and statistics courses, students study the basic medical sciences and the biological aspects of public health problems. The program is primarily intended for students who expect to continue toward a doctoral degree.

Required courses include EPI 201, *Introduction to Epidemiology*; EPI 202, *Elements of Epidemiologic Research*; EPI 203, *Design of Case-Control and Cohort Studies*; EPI 204, *Analysis of Case-Control and Cohort Studies*; BIO 201, *Introduction to Statistical Methods*; and BIO 210, *The Analysis of Rates and Proportions*. Recommended courses include EH 205, *Human Physiology*; BIO 211, *Regression and Analysis of Variance in Experimental Research*; BIO 213, *Applied Regression for Clinical Research*; CCB 210, *Introduction to Cancer Biology*; CCE 204, *Principles of Toxicology*; DBE 208, *Pathophysiology of Human Disease*; and ID 265, *Practice of Quantitative Methods*.

For more information about research and training in Pharmacoepidemiology, please contact Alexander M. Walker, MD, DPH, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4565
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For more information about research and training in Psychiatric Epidemiology, please contact Stephen L. Buka, SD, Department of Maternal and Child Health, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3870
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E-mail: sbuka@sph.harvard.edu

For more information about the department, visit the department's web page at: epinet.harvard.edu/.

Lisa F. Berkman, MS, PhD (University of California, Berkeley); Florence Sprague Norman and Laura Smart Norman Professor of Health and Social Behavior and of Epidemiology. Social epidemiology; epidemiology of aging.

Stephen L. Buka, SM, SM, SD (Harvard University); Associate Professor of Maternal and Child Health and Epidemiology. Causes and prevention of behavioral and developmental disorders of children.

Kin-Wei Arnold Chan, MD (National Taiwan University), MPH, SD (Harvard University); Assistant Professor of Epidemiology. Outcomes research on pharmaceutical agents in naturalistic settings, including cost-effectiveness analysis, quality-of-life assessment, pre-marketing economic evaluation of potential products, and post-market surveillance of adverse events; epidemiology of rheumatic diseases.

David C. Christiani, MD (Tufts University), SM, MPH (Harvard University); Professor of Occupational Medicine and Epidemiology and Director of the Educational Resource Center for Occupational Safety and Health; Professor of Medicine, Harvard Medical School. Occupational diseases; biomarkers and molecular epidemiology.

E. Francis Cook, MA (University of Massachusetts), SM, SD (Harvard University); Professor of Epidemiology. Epidemiologic methods; clinical epidemiology.

Wafaie W. Fawzi, MB, BS (University of Khartoum), MPH, SM, DPH (Harvard University); Assistant Professor of International Nutrition and Epidemiology. Etiologies of infectious diseases with emphasis on dietary and nutritional causes; relationships of dietary factors to disease in pregnancy and childhood.

Edward L. Giovannucci, MD (University of Pittsburgh), MPH, SD (Harvard University); Assistant Professor of Nutrition and Epidemiology. Etiologies of cancer with emphasis on dietary causes; methodologies to measure dietary factors in epidemiologic studies.

Marlene B. Goldman, SM, SD (Harvard University); Associate Professor of Epidemiology. Effect of environmental and occupational exposures on reproductive health; cancer epidemiology.

Susan E. Hankinson, MS, MPH (University of Minnesota), SD (Harvard University); Assistant Professor of Epidemiology. Relationships between hormonal factors and risk of breast and ovarian cancers.

David J. Hunter, MB, BS (University of Sydney), MPH, SD (Harvard University); Professor of Epidemiology and Director of the Harvard Center for Cancer Prevention. Cancer epidemiology; molecular epidemiology.

Camara P. Jones, MD (Stanford University), PhD (Johns Hopkins University); Assistant Professor of Health and Social Behavior and Epidemiology. Development and application of epidemiologic methods to explore social stresses associated with racism.

Frederick P. Li, MD (University of Rochester), MA (Georgetown University); Professor of Clinical Cancer Epidemiology; Professor of Medicine, Harvard Medical School. Inherited susceptibility to cancer; clinical and molecular epidemiology.

Richard R. Monson, MD, SM, SD (Harvard University); Professor of Epidemiology (Environmental Health and Epidemiology) and Associate Dean for Professional Education. Relationship between the workplace, the environment, and disease.

Nancy E. Mueller, SM, SD (Harvard University); Professor of Epidemiology. The role of viruses in the etiology of cancer; cancer epidemiology.

Eric B. Rimm, SD (Harvard University); Associate Professor of Epidemiology and Nutrition. Relation of dietary factors to the occurrence of human diseases, in particular cardiovascular disease.

Master of Science in Epidemiology (two-semester program)

The two-semester (40-credit) SM provides students with basic skills in epidemiologic and quantitative methods and in computing, in preparation for research or academic careers. Required courses include EPI 201, *Introduction to Epidemiology*; EPI 202, *Elements of Epidemiologic Research*; EPI 203, *Design of Case-Control and Cohort Studies*; EPI 204, *Analysis of Case-Control and Cohort Studies*; BIO 201, *Introduction to Statistical Methods*; and BIO 210, *The Analysis of Rates and Proportions*. The remainder of the schedule reflects areas of special interest and may include supervised research. The two-semester program is open to applicants with a medical degree or master's-level background in biology.

Doctor of Science in Epidemiology/ Doctor of Public Health

The doctoral programs are designed for students who plan careers in epidemiologic research or teaching or for those who aspire to leadership roles in the health professions. Applicants to the SD program should hold at least a bachelor's degree and have a strong background in biology and mathematics. For these individuals, the degree generally takes four to five years to complete; candidates with relevant doctoral degrees may complete the program in three years. The DPH degree is available to students holding a prior doctorate and an MPH degree.

Course requirements are the same as for the SM program, with the addition of EPI 205, *Practice of Epidemiology*; EPI 207, *Advanced Epidemiologic Methods*; EPI 227, *Principles of Screening*; and for non-physicians, EH 205, *Human Physiology*, and DBE 208, *Pathophysiology of Human Disease*. In addition, 10 credits are required in substantive courses offered by the department, 10 credits in biostatistics above the level of BIO 200, and 10 credits in a second minor field.

Unless courses equivalent to those described for the master's program have been taken previously, most of the first two years is devoted to coursework. Subsequently, doctoral candidates must pass the departmental written examination and the school-wide oral qualifying examination; adhere to the doctoral timetable for maintaining satisfactory progress; complete, defend, and submit a thesis; and gain experience in teaching and research.

Courses Offered by the Department of Epidemiology, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information. One of EPI 200, EPI 201, or EPI 208 satisfies the school-wide requirement for an introductory course in epidemiology; however, individual programs may require a particular course.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

EPI 200. Principles of Epidemiology
EPI 200a. (S. Hankinson, N. Mueller)
EPI 200s. (A. Hofman)
Introduces basic principles and methods of epidemiology. Lectures are complemented by seminars devoted to exercises or to the discussion of current epidemiologic studies. (2.5 credits)

EPI 201a. Introduction to Epidemiology (E. Cook, K. Chan)
Covers principles and methods used in epidemiologic research. Designed for students majoring in epidemiology or biostatistics, or who desire a more detailed introduction to the main issues encountered in the design, implementation, and analysis of epidemiologic studies. (2.5 credits)

EPI 202. Elements of Epidemiologic Research
EPI 202b. (D. Spiegelman, M. Mittleman)
EPI 202t. (M. Mittleman)
Introduces elements of study design, data analysis, and inference in epidemiologic research. May serve as an introduction to more advanced study or as a concluding course for those desiring a working knowledge of epidemiologic methods. (2.5 credits)

EPI 203c. Design of Case-Control and Cohort Studies (A. Walker, A. Ascherio)
Examines common problems in the design, analysis, and interpretation of observational studies. Considers problems of exposure and disease definitions, time-dependent effects, confounding, and misclassification, and introduces relevant statistical methods. (2.5 credits)

EPI 204d. Analysis of Case-Control and Cohort Studies (C. Hsieh, K. Joshipura)
Develops material presented in EPI 203c into the rationale and methodology for mathematical modeling of study parameters. Emphasizes Poisson and logistic regression. (2.5 credits)

EPI 205ab. Practice of Epidemiology (E. Rimm, M. Stampfer)
Requires students to present and discuss plans for collection and analysis of epidemiologic data. Preparatory work is done under tutorial arrangements with members of the faculty. Emphasizes conceptual issues rather than execution. (2.5 credits)

EPI 207b. Advanced Epidemiologic Methods (J. Robins)
Provides in-depth investigations of statistical methods for drawing causal inferences from observational studies. Defines informal epidemiologic concepts such as confounding, comparability, overall effects, direct effects, intermediate variables, and selection bias within the context of a counterfactual causal model. Emphasizes methods for the analysis of causal effects of time-varying exposures in the presence of time-dependent covariates that are simultaneously confounders and intermediate variables. (2.5 credits)

EPI 208st. Introduction to Clinical Epidemiology (D. Singer, E. Cook)
Covers principles and methods used in traditional and clinical epidemiologic research. (5 credits)

EPI 212a. Epidemiology of Cardiovascular Diseases (M. Stampfer)
Reviews the epidemiology of coronary heart disease and stroke. Presents demographic distribution and time trends of these diseases and discusses known risk factors. (1.25 credits)

EPI 213c. Epidemiology of Cancer (S. Hankinson, E. Giovannucci)
Reviews basic concepts and issues central to cancer epidemiology. Considers the descriptive epidemiology of cancer and discusses implications of the biology of cancer for identification of risk factors. Examines the role of smoking, radiation, nutrition, and other exposures. (2.5 credits)

EPI 214d. Epidemiologic Analysis of Outbreaks and Infectious Diseases (J. Freeman)
Discusses the use of epidemiologic methods in analyzing outbreaks and investigating infectious diseases. Illustrates different types of problems and methods of analysis and stresses literature review and practical methodology. (2.5 credits)

EPI 216d. Epidemiology in Public Health Practice (R. Dicker)
Teaches the principles and practice of field epidemiology through a series of case studies. Focuses on resolving conflicts between epidemiologic theory and practical considerations that can arise while addressing public health problems in the community. (2.5 credits)

EPI 217a. The Epidemiology of Adult Psychiatric Disorders (P. Wang, M. Tsuang)
Covers classical and recent readings on the occurrence and distribution of psychiatric illness. Describes the application of basic epidemiologic research designs to the study of psychiatric conditions. (2.5 credits)

EMH 218d. Environmental and Social Risk Factors for Psychiatric Disorders (S. Buka, J. Murphy, L. Berkman)
Reviews research methodology and empirical studies of genetic and psychosocial risk factors for psychiatric disorders. Topics include prenatal risk factors, childhood trauma, social networks and social support, ethnicity and religion, gender and mental health, and psychosocial risk factors. (1.25 credits)

EPI 219b. Assessment Concepts and Methods in Psychiatric Epidemiology (D. Blacker)
Presents the application of basic epidemiologic and psychometric concepts and methods in psychiatric research. Topics include measurement theory, reliability, validity, screening, and diagnostic classification procedures. (2.5 credits)

James M. Robins, MD (Washington University); Professor of Epidemiology and Biostatistics. Development of analytic methods for drawing causal inferences from complex observational and randomized studies with time-varying exposures or treatments.

Donna L. Spiegelman, SM, SD (Harvard University); Associate Professor of Epidemiology and Biostatistics. Binary data models with measurement error and misclassification in model covariates.

Meir J. Stampfer, MD (New York University), MPH, DPH (Harvard University); Professor of Epidemiology and Nutrition. Influence of diet and exogenous hormones on health, particularly heart disease and cancer.

Sherri O. Stuver, SD (Harvard University); Assistant Professor of Cancer Epidemiology. Cancer epidemiology; virus-associated disease.

Dimitrios V. Trichopoulos, MD (University of Athens), SM (Harvard University); Vincent L. Gregory Professor of Cancer Prevention and Professor of Epidemiology. Cancer epidemiology.

Walter C. Willett, MD (University of Michigan), MPH, DPH (Harvard University); Fredrick John Stare Professor of Epidemiology and Nutrition; Professor of Medicine, Harvard Medical School. Relation of dietary factors to the occurrence of human disease, in particular heart disease and cancer.

Xiping Xu, MD (Anhui Medical University, China), PhD (University of Tsukuba, Japan), SM (Harvard University); Associate Professor of Occupational Epidemiology (Environmental Health and Epidemiology); Associate Professor of Medicine, Harvard Medical School. Environmental, occupational, and genetic epidemiology of respiratory, cardiovascular, and metabolic diseases.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School, unless otherwise indicated.

Deborah Blacker, MD, SD (Harvard University); Assistant Professor in the Department of Epidemiology. Genetic epidemiology of affective disorders and of Alzheimer's disease.

Julie E. Buring, MS (University of Washington), SD (Harvard University); Professor in the Department of Epidemiology. Epidemiology of cardiovascular disease and cancer; teaching of epidemiology; epidemiologic methodology.

Graham A. Colditz, MB, BS (University of Queensland), MPH, DPH (Harvard University); Professor in the Department of Epidemiology. Cancer epidemiology; diet and chronic diseases.

Chester W. Douglass, DMD (Temple University), MPH, PhD (University of Michigan); Professor in the Department of Epidemiology. Primary affiliation: Harvard School of Dental Medicine. Oral epidemiology and health policy.

Kathleen M. Egan, MPH (Boston University), SD (Harvard University); Assistant Professor in the Department of Epidemiology. Epidemiology of molecular genetics of intraocular tumors; survival determinants in choroidal melanoma; epidemiology of breast and ovarian cancer.

Jonathan Freeman, SM, SD (Harvard University), MD (Duke University); Assistant Professor in the Department of Epidemiology. Infectious diseases, especially nosocomial infections.

Francine Grodstein, SD (Harvard University); Assistant Professor in the Department of Epidemiology. Health effects of exogenous hormones; risk factors for Alzheimer's disease.

EPI 220d. Diagnosis in Clinic and Community Programs (G. Zornberg, J. Murphy)
Focuses on interview schedules designed to diagnose psychiatric disorders in clinical settings and household surveys. Provides practical experience in differential diagnosis, in the administration of different kinds of interview schedules, and in analysis of responses. (2.5 credits)

EPI 221b. Pharmacoepidemiology (A. Walker)
Covers inference about the effects of pharmaceuticals from case reports, case series, vital statistics and other registration schemes, cohort studies, and case-control studies. Discusses decision making with inadequate data from the perspectives of manufacturers and regulators. (2.5 credits)

EPI 222d. Genetic Epidemiology of Diabetes and Its Complications (A. Krolewski, J. Warram)
Uses the genetics of diabetes and its complications, together with the descriptive epidemiology of these conditions, to illustrate the process of generating etiologic hypotheses that can be studied by the methods of genetic epidemiology. (2.5 credits) Not offered 1999-2000.

EPI 224a. Cancer Prevention (G. Colditz)
Introduces cancer prevention and control from a broad range of disciplines. Covers epidemiology and biology of cancer, approaches to prevention through behavior change, and models of behavior change. (2.5 credits)

EPI 225c. Epidemiology of Infectious Diseases (J. Freeman)
Covers basic concepts and issues central to the epidemiology of infectious diseases. Topics include properties of infectious agents and the nature of host defenses, the dynamics of occurrence of communicable diseases, and the relation between human behavior and the actions of governments. (2.5 credits)

EPI 227d. Principles of Screening (G. Colditz, I. Kawachi, B. Rockhill)
Provides a basic understanding of the principles of screening. Emphasizes screening for cancer and applications in other settings. Discusses controversies and limitations of screening strategies. (2.5 credits)

EPI 228ab. Oral Epidemiology (C. Douglass, K. Joshipura)
Discusses the principal measures and methods of epidemiology as they apply to oral conditions; the distribution, etiology, and risk factors for a number of these conditions; and links between oral epidemiologic data and health policy issues. (2.5 credits) Not offered 1999-2000.

EPI 229c. Ophthalmic Epidemiology (J. Seddon)
Reviews the epidemiology of leading causes of blindness, including cataract, macular degeneration, glaucoma, and diabetic retinopathy. Considers results from various epidemiologic study designs. (1.25 credits) Not offered 1999-2000.

EPI 233. Research Synthesis and Meta-Analysis Applications in Public Health and Clinical Medicine
EPI 233d. (G. Colditz)
EPI 233s. (M. Stoto)
Reviews the principles of meta-analytic statistical methods and explores the application of these to data sets. Application of methods includes considerations for clinical trials and observational studies. Emphasizes the use of meta-analysis to explore data and identify sources of variation among studies, and to identify future research questions. (2.5 credits)

EPI 236s. Advanced Methods in Clinical Epidemiology (E. Cook)
Examines study design and analytic issues encountered in clinical research. Focuses on techniques for stratified analysis, regression modeling, and recursive partitioning. (5 credits)

EPI 240d. Use of Biomarkers in Epidemiologic Research (S. Stuver, S. Hankinson)
Provides an overview of issues pertinent to the collection, measurement, and statistical analysis of biomarker data. Topics include study-design considerations, sample storage, sources of laboratory variability, assay evolution, use of pooled samples, and repeated measures analysis. (1.25 credits)

EPI 241ab. Clinimetrics (E. Cook)
Examines methodologic issues related to measures of health status encountered in clinical research. Topics include instrument development; scaling; assessment of reliability, validity, and responsiveness to change; principal component analysis and factor analysis. (2.5 credits)

EPI 242abcd. Seminar in Clinical Epidemiology (D. Singer, E. Cook, J. Orav)
Draws on presentations by guest speakers to expose students to a number of clinical research projects, to a variety of research designs and analytic strategies, and to pertinent methodologic issues. (2.5 credits)

EPI 244cd. Methods for Studying Genetic Factors in Psychiatric Epidemiology (S. Santangelo, M. Tsuang)
Presents classical and current research methodology for genetic epidemiologic studies of complex (non-Mendelian) disorders using examples drawn from the psychiatric genetics literature on disorders such as schizophrenia, major affective disorders, substance abuse, Alzheimer's disease, and autism. Topics include issues in phenotype definition; Mendelian genetics; design and analysis of family, twin, and adoption studies; heritability estimation; segregation analysis; linkage analysis methods; and association studies. (5 credits) Not offered 1999-2000.

EPI 247b. Epidemiologic Methods Development: Past and Present (M. Mittleman)
Provides students with an understanding of the theoretical basis of currently used epidemiologic methods and helps students acquire an understanding of the process of developing new approaches by reviewing classic papers and tracing the evolution of epidemiologic ideas. (2.5 credits)

EPC 249a Molecular Biology for Epidemiologists (B. Glassner, D. Hunter)
Presents an overview of molecular biology and techniques commonly used in the laboratory and in epidemiological research. Topics include the structure of DNA and genes, DNA replication, transcription, and RNA translation. (2.5 credits)

EPI 250b. Molecular Epidemiology of Cancer (F. Li)
Offers an overview of the molecular genetics and epidemiology of cancer, emphasizing the use of new laboratory techniques in epidemiologic studies. Discusses the application of epidemiologic methods to the generation of new etiologic hypotheses. (1.25 credits)

EPI 251c. Studies in Molecular Epidemiology (D. Hunter)
Acquaints students with recent developments in molecular epidemiology, including molecular markers of environmental exposures, applications to risk assessment, and genetic markers of susceptibility. Applications cover cancer, cardiovascular disease, and infectious diseases. (1.25 credits)

EPI 252d. Infections and Cancer (N. Mueller, S. Stuver)
Reviews the epidemiology and public health impact of viral and other infectious-agent-associated malignancy. Discusses the role of host response and the use of serology and viral probes as risk markers. (2.5 credits) Not offered 1999-2000.

EPI 269d. Epidemiologic Research in Obstetrics and Gynecology (B. Harlow, D. Cramer)
Emphasizes the clinical and physiological underpinnings of the methods and results from epidemiologic research in the areas of contraception, infertility, pregnancy, menopause, and both benign and malignant gynecological conditions. (1.25 credits)

EPI 283f. Topics in Cancer Epidemiology (N. Mueller)
Reviews key papers in cancer epidemiology, emphasizing issues in hypothesis testing, study design, and integration of biological markers. (1 credit)

EPI 310. Research in Clinical Epidemiology (E. Cook)
Fulfills the clinical research requirement for students concentrating in Clinical Epidemiology who intend to complete the requirements for the SM during summer study. The research project is determined by the faculty member assigned as principal advisor to the student. (Credit to be arranged)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or to undertake specialized readings or studies in the following areas: neoplastic diseases, cardiovascular disease, clinical epidemiology, molecular and genetic epidemiology, environmental epidemiology, occupational epidemiology, infectious diseases, epidemiologic methods, nutritional epidemiology, virus-associated chronic disease/AIDS, psychiatric epidemiology, pharmacoepidemiology, oral and dental health epidemiology, and reproductive epidemiology.

Adjunct Faculty

Hans-Olov Adami, MD, PhD; Professor of Cancer Epidemiology, University Hospital, Uppsala, Sweden.

Richard C. Dicker, MD, SM; Chief Medical Officer/Epidemiology Team Leader, Division of Health and Standards and Quality, Health Care Financing Administration.

Anders Ekbom, MB, MD, PhD; Associate Professor of Surgery, University Hospital, Uppsala, Sweden.

Albert Hofman, MD, PhD; Professor of Epidemiology and Chairman, Department of Epidemiology and Biostatistics, Erasmus Univeristy Medical School, Rotterdam, The Netherlands.

Chung-cheng Hsieh, MPH, SM, SD; Lecturer, Division of Biostatistics and Epidemiology, University of Massachusetts Medical Center.

Carlo LaVecchia, MD, MSc; Associate Professor, Medical Statistics and Biometrics Department, University of Milan.

K. Malcolm Maclure, SM, SD; Epidemiologist, Ministry of Health, Province of British Columbia, Canada.

Ralph S. Paffenbarger, Jr., MD, DrPH; Professor of Epidemiology, Emeritus, Stanford University.

Kenneth J. Rothman, DMD, MPH, DPH; Professor, Departments of Epidemiology and Community Medicine, Boston University.

Susan L. Santangelo, SD; Assistant Professor, Department of Psychiatry, New England Medical Center at Tufts University School of Medicine.

Kaumudi J. Joshipura, SM, SD (Harvard University); Assistant Professor in the Department of Epidemiology. Primary affiliation: Harvard School of Dental Medicine. Oral epidemiology.

Andrzej S. Krolewski, MD, PhD (Warsaw Medical School); Associate Professor in the Department of Epidemiology. Diabetes mellitus epidemiology.

I-Min Lee, MB, BS (National University of Singapore), MPH, SD (Harvard University); Assistant Professor in the Department of Epidemiology. Epidemiology of cancer; physical activity and fitness and cancer incidence.

Thomas H. Lee, Jr., MD (Cornell University), SM (Harvard University); Associate Professor in the Department of Epidemiology. Prognostic stratification in, and cost-effectiveness analysis of, management of cardiovascular disease.

JoAnn E. Manson, MD (Case Western Reserve University), MPH, DPH (Harvard University); Associate Professor in the Department of Epidemiology. Chronic disease epidemiology.

Murray A. Mittleman, MDCM (McGill University), MPH, DPH (Harvard University); Assistant Professor in the Department of Epidemiology. Epidemiology of acute risk factors triggering myocardial infarction and stroke; methodological problems in implementing case-crossover studies; psychosocial factors and cardiovascular disease.

Jane M. Murphy, PhD (Cornell University); Professor in the Department of Epidemiology. Longitudinal studies of psychiatric epidemiology in general populations.

Johanna M. Seddon, MD (University of Pittsburgh), SM (Harvard University); Associate Professor in the Department of Epidemiology. Ophthalmology.

Daniel E. Singer, MA (Oxford University), MD (Harvard University); Associate Professor in the Department of Epidemiology. Preventive health care.

Ming T. Tsuang, MD (National Taiwan University), PhD (University of London); Professor in the Department of Epidemiology. Follow-up and family studies of psychiatric disorders with emphasis on schizophrenia and affective disorders.

Joseph West
Master's Student
Department of Health and Social Behavior

Joseph West believes epidemiology can help researchers understand social environments as related to health determinants. "I'm focusing on minority populations," he says. "African-American and Latino men, regardless of income, have higher rates of heart disease, cancer, and HIV/AIDS, and they are more likely to be victims of violence than non-minorities."

West chose to enroll in the Department of Health and Social Behavior after working with Felton Earls, professor in the Department of Maternal and Child Health, on the Project on Human Development in Chicago Neighborhoods. "Public health is an extension and culmination of all fields: politics, medicine, and economics," West says, explaining his decision to study at HSPH.

Since coming to the school, West has helped coordinate the Men of Color Health Program in a Cambridge clinic. "They provide health services such as physical exams and screenings, but also address some of the social problems that affect health: racism and prejudice, illiteracy, and unemployment," says West. "There are many opportunities at HSPH for becoming involved with the local community."

The mission of the Department of Health and Social Behavior is to advance and apply new knowledge from the social and behavioral sciences to the solution of pressing public health problems. The department is working to understand the social and behavioral factors that challenge the health of populations and to develop interventions that can improve health and the quality of life.

As both a philosophical stance and a practical reality, the Department of Health and Social Behavior views the social environment as a major determinant of health and behavior. Research is therefore anchored in social settings, such as communities, schools and colleges, workplaces, and health care delivery systems. Members of the department have ongoing research projects in each of these settings, organized by risk (social networks, socio-economic status, working conditions, literacy level, drug and alcohol use, diet, physical activity), by disease (cancer, cardiovascular and neurological diseases, arthritis, asthma, AIDS), and/or by population (children, adolescents, parents, older men and women). Recognizing the importance of public health communication, the department also emphasizes the role of interpersonal, small group, written, and mass media communications in much of its work.

The department's educational mission is to train both scholars and practitioners: scholars whose research will illuminate basic social determinants of health and who will identify and test innovative social interventions, and practitioners who are skilled in designing, implementing, and evaluating health-enhancing interventions in action settings and who appreciate the social ecology of health behavior as well as social and policy leverage points.

All students in Health and Social Behavior are required to take (at minimum) the school-wide requirements in biostatistics and epidemiology; students in SM programs must also fulfill core requirements in environmental health and public policy. In addition, the department requires two core courses: HMP 200, *Social and Behavioral Dimensions of Public Health,* and HSB 201, *Society and Health*. Beyond these core requirements, students may wish to concentrate their work on the conceptual models of relationships between social forces and health, on the design and evaluation of interventions for healthful change, or on the design of public policy to improve health. Students are urged to work closely with their advisors to delineate education and career goals and plan a course of study. To facilitate this effort, the department has identified three areas of interest.

Social Determinants of Health This area of interest focuses on analysis of the major social conditions that affect the health of populations. Seminars, tutorials, and courses enable students to explore a range of health consequences of various social factors by studying varied subgroups, at different times and places, under diverse and changing conditions. Students examine mechanisms and processes through which social factors exert their impact, as well as mechanisms that mediate or moderate relationships between social factors and health outcomes.

Program Design and Planned Social Change This area of interest focuses on the application of theory in the design of intervention programs as well as on research and evaluation methodology. Attention is given to the following design steps: problem diagnosis, assessment, formative research, program design, and evaluation. The social settings for interventions may include communities, workplaces, schools and colleges, and health care facilities. Populations of interest include those who are underserved, marginalized, and in special need. Targeted populations may be segmented by age, gender, socioeconomic status, ethnicity, and geographic location. Intervention strategies include community organizing and improvement, social marketing, communication, adult learning approaches, and advocacy.

Health and Social Policy A wide range of social policies have a dramatic impact on health including, but not limited to, labor, poverty, family, housing, and educational policy. This area of interest prepares students to design new and improve existing social policies and teaches strategies for the successful implementation of social policies that improve health. Students who study in this area may be interested in working on public policy through research, in the government, or in a nonprofit organization.

As described below, the department offers both a four-semester and a two-semester Master of Science (SM) program, as well as a program leading to the Doctor of Science (SD) or Doctor of Public Health (DPH) degree. Please refer to page 9 for information about the Master of Public Health concentration in Family and Community Health.

Master of Science in Health and Social Behavior (four-semester program)

The four-semester master's program prepares students for work in a variety of community, public, and private settings with a focus on program design, public policy supervision, evaluation, and for work as members of research teams.

Students enter the four-semester program with a background (often a major) in the social/behavioral sciences and experience in the field. This degree does not require previous graduate work.

Of the 80 credits necessary to earn the four-semester SM, at least 20 must be earned in departmental courses. Students in this program must also fulfill core requirements in biostatistics, epidemiology, environmental health, and public policy. Students are encouraged to delineate professional goals and to develop an area of expertise. They often focus on a subject area (such as AIDS, addiction, cardiovascular risk reduction, cancer, environmental health, health education, the health of families, labor and workplace issues, literacy, and women's health) and/or a skill area (such as program design, program evaluation, communication, public policy, marketing). Master's students are encouraged to declare an area of interest within Health and Social Behavior and to complete an internship as part of their training.

Master of Science in Health and Social Behavior (two-semester program)

The two-semester master's program also prepares students for work in a variety of community, public, and private settings with a focus on program design, supervision, and evaluation, and for work as members of research teams. One recent graduate is serving as the evaluator on a violence prevention program for adolescents; another works with a nonprofit organization coordinating international efforts related to women's health.

For more information about research and training in Health and Social Behavior, please contact Michele Brooks, Academic Coordinator, Department of Health and Social Behavior, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-3775
Fax: 617-432-3755
E-mail: mbrooks@hsph.harvard.edu

Faculty

Department Chair: Lisa F. Berkman, MS, PhD (University of California, Berkeley); Florence Sprague Norman and Laura Smart Norman Professor of Health and Social Behavior and of Epidemiology. Social epidemiology; epidemiology of aging.

Dolores Acevedo-Garcia, MPA, PhD (Princeton University); Assistant Professor of Health and Social Behavior. Effects of residential segregation on minority health; health effects of welfare reform and immigration policies on US immigrants and citizens; demographic projections of Latin American immigration to the US; race/ethnic, gender, and social class inequalities in health.

H. William DeJong, MA, PhD (Stanford University); Lecturer on Health Communication. Use of mass media for health promotion; alcohol and tobacco control policies; drunk driving prevention; violence prevention; organ donation.

Karen M. Emmons, MA, PhD (State University of New York at Stony Brook); Associate Professor of Health and Social Behavior. Health promotion; smoking and environmental tobacco smoke health effects; worksite and community-based interventions.

Thomas A. Glass, MA, PhD (Duke University); Assistant Professor of Health and Social Behavior. Psychosocial epidemiology; behavioral intervention models; gerontology; medical sociology.

Steven L. Gortmaker, SM, PhD (University of Wisconsin); Senior Lecturer on Sociology. Statistical evaluation methods; social class and infant and child health; obesity and television viewing; AIDS; chronic disease.

S. Jody Heymann, MPP, MD, PhD (Harvard University); Associate Professor of Health and Social Behavior; Assistant Professor of Health Care Policy, Harvard Medical School. Influence of social, labor, and welfare policy on health; health-care policy for high-risk children with chronic conditions. (On leave until August, 2000)

Camara P. Jones, MD (Stanford University), PhD (Johns Hopkins University); Assistant Professor of Health and Social Behavior and Epidemiology. Development and application of epidemiologic methods to explore social stresses associated with racism.

Students enter the two-semester program with a related graduate degree and with experience in the social/behavioral sciences or a public health field.

Of the 40 credits necessary to earn the two-semester SM, at least 15 must be earned in departmental courses. Students in this program must also fulfill core requirements in biostatistics, epidemiology, environmental health, and public policy. Students are encouraged to focus their work in a specific content or skill area. They should work closely with their advisors to develop a study plan early in the fall semester.

Doctor of Science in Health and Social Behavior/Doctor of Public Health

The doctoral programs train students as scholars and researchers who will identify new social and behavioral risks, work in health and social policy, and test innovative social interventions, or as practitioners who will design, implement, and evaluate health-enhancing interventions or public policies. Recent graduates are working in research and academic settings.

Doctoral programs are offered in three areas of interest: social determinants of health, program design and planned social change, and health and social policy. Most students enter the doctoral programs with a strong foundation in the social and behavioral sciences and with an earned master's degree. The department accepts a small number of students without a master's degree directly into the doctoral program.

Requirements for doctoral students include area-specific course work in theory and methods; students should consult the department's doctoral handbook for a listing of required courses in each of the areas of interest. Doctoral candidates must pass the departmental written examination and the school-wide oral qualifying examination, must adhere to the doctoral timetable for maintaining satisfactory progress, and must complete, submit, and defend a thesis based on original research.

Women, Gender, and Health

HSPH offers a number of courses relating to women, gender, and health. For more information, see page 7.

Courses Offered by the Department of Health and Social Behavior, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

HMP 200c. Social and Behavioral Dimensions of Public Health (L. Berkman, S. Buka, C. Jones, C. Obermeyer)
Introduces fundamental social and behavioral science concepts, methods, and theories needed to understand social influences on health status. Emphasizes quantitative and qualitative research methods in social sciences applied to observational and intervention-oriented studies. (2.5 credits)

HSB 201. Society and Health
HSB 201a. (I. Kawachi)
HSB 201s. (L. Berkman)
Analyzes major social variables that affect population health: poverty, social class, gender, race, family, community, work, behavioral risks, and coping resources. Examines health consequences of social and economic policies, and the potential role of specific social interventions. (2.5 credits)

HSB 202b. Innovative Strategies in Health Education (R. Rudd)
Focuses on the development of theory-based health education strategies for change. Case examples of health programs designed to address health issues and social inequalities add to the analysis process. (2.5 credits)

HSB 204b. Communication in Health Care Settings (L. Daltroy)
Focuses on theory and practice of health education in the clinical encounter: doctor-patient communication, patient education, adherence to medical regimen, and cognition and behavioral skills in chronic disease co-management. (2.5 credits) Not offered 1999-2000.

HSB 205a. Teaching and Working with Groups (R. Rudd)
Uses role play and reflective analysis to help participants develop listening skills, experiment with activities that build group cohesion and trust, and focus on group maintenance as well as task-oriented roles. (2.5 credits)

HSB 207b. "Race" and Racism (C. Jones)
Explores the roles of "race" and racism in relation to health outcomes in the US. Topics include the history of the concept of "race," the use of "race" in scientific research, and the role of "race" as a social risk factor. (2.5 credits)

HSB 211ab. Health Promotion Through the Mass Media (W. DeJong)
Covers the development of public communication campaigns in the field of health promotion: assessing the mass media's potential for health promotion, designing mass communication materials consonant with behavioral science principles and the public health model, and executing a media campaign. (2.5 credits)

HSB 212cd. Developing Radio Communications (W. DeJong)
Covers the development and use of radio communications in public health. Participants create an original radio commercial, moving from background research to scripting and final production. (2.5 credits)

HSB 214cd. Health and Literacy Practicum (R. Rudd)
Focuses on linkages between health and literacy and between health and adult education theory and methods. Participants hone skills in assessing literacy demands in health communications as they engage in structured fieldwork. (5 credits) Not offered 1999-2000.

HSB 215ab. History, Politics, and Public Health: Theories of Disease Causation Across Time and Culture (N. Krieger)
Focuses on social and scientific contexts, content, and implications of theories of disease causation from diverse periods in history and various cultures. Teaches students a historical and critical perspective of current theories of disease causation. (5 credits)

HSB 216e. Use of Media to Work and Fight for Better Health Around the World (L. Berkman)
Presents theories of electronic communication and strategies of media lobbying. Reviews collected audio and video recordings made by important media thinkers. Course given in New York City. (1.25 credits)

HSB 217cd. Disaster Management (C. Pierce, J. Leaning)
Prepares those responsible for on-the-scene, immediate, acute intervention during disasters by focusing on decision making under stress. Examines case studies within the theoretical framework of disaster planning, response, and assessment. (2.5 credits)

Ichiro Kawachi, MD, PhD (University of Otago, New Zealand), DipCommH (College of Community Medicine of New Zealand); Associate Professor of Health and Social Behavior. Social inequalities in health, especially related to income distribution; stress and cardiovascular disease; quality of life and healthy aging; tobacco control.

Nancy Krieger, MS (University of Washington), PhD (University of California, Berkeley); Associate Professor of Health and Social Behavior. Social inequalities in health, especially regarding race/ethnicity, social class, and gender; cancer, especially breast cancer; cardiovascular disease, especially hypertension; epidemiologic theory and history.

Rima E. Rudd, MSPH (University of Massachusetts), ScD (Johns Hopkins University); Lecturer on Health Education. Public health and adult education pedagogy; normative change and change strategies, including small group communications, community organizing, social marketing, and health and literacy.

Glorian Sorensen, MPH, PhD (University of Minnesota); Professor of Health and Social Behavior. Cancer prevention in the workplace; intervention research in community and occupational settings.

Henry Wechsler, AM, PhD (Harvard University); Lecturer on Social Psychology. Alcohol and drug use and related high-risk behaviors among youth; epidemiologic, preventive, and public policy approaches to substance abuse prevention.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School

Paul D. Cleary, MS, PhD (University of Wisconsin); Professor in the Department of Health and Social Behavior. Effectiveness of behavior change programs; design and use of patient reports on the quality and outcomes of medical care.

Lawren H. Daltroy, MPH (University of Michigan), DrPH (Johns Hopkins University); Assistant Professor in the Department of Health and Social Behavior. Application of social psychology and decision-making theory to patient education in chronic disease; functional status measurement in arthritis.

Thomas S. Inui, MD, ScM (Johns Hopkins University); Professor in the Department of Health and Social Behavior. Primary care effectiveness; health-related behavior; clinical prevention.

Sue Ellen Levkoff, MSW (New York University), SM, SD (Harvard University). Associate Professor in the Department of Health and Social Behavior. Influence of culture on the experience of and response to dementia symptoms; prevention of excess disability in cognitively impaired aged; delirium in the hospitalized elderly.

Adjunct Faculty

Anne M. Stoddard, SM, SD; Associate Professor of Public Health, University of Massachusetts.

Diana Chapman Walsh, MS, PhD; President, Wellesley College.

John E. Ware, Jr., MA, PhD; Senior Scientist, The Health Institute, New England Medical Center.

HSB 219f. Community-Oriented Primary Care (C. Jones, A. Schlaff)
Introduces the concept of community-oriented primary care, in which a health care facility takes on the community as a patient. (1.25 credits)

HSB 220cd. An Introduction to High-Risk Behaviors: Epidemiology, Prevention, and Public Policy (H. Wechsler)
Examines behaviors that place an individual at higher risk of morbidity and mortality. Focuses on epidemiology of smoking, alcohol abuse, drug abuse, gambling, inactivity, lack of proper nutrition, violence, accidental injury, unsafe driving, and unsafe sex. (5 credits)

HSB 221cd. Psychosocial Theories of Health and Health Behavior (K. Emmons, L. Daltroy)
Explores theoretical approaches to health-related behavior change, emphasizing the use of psychosocial theories in research. Theories include the health beliefs model, reasoned action, planned behavior, social learning, and the transtheoretical model. (5 credits)

HSB 222c. Alcohol Abuse and Alcoholism from a Public Health Perspective
Covers the nature and scope of alcoholism and alcohol abuse as a public health problem; patterns of use and abuse; diagnosis and medical complications; and treatment and prevention. (2.5 credits)

HSB 225d. Health and Social Policy in the Workplace (S. Heymann)
Explores ways that workplace health and social policies create a positive or negative effect on the health and welfare of individuals, families, and communities. (2.5 credits)

HSB 227cd. Planned Social Change (R. Rudd)
Introduces a disciplined and theory-based approach to program planning and evaluation. Applies social science principles to community assessment, program design, and a three-staged evaluation for health-related programs of planned social change. (5 credits)

HSB 228a. Psychosocial Aspects of Aging (T. Glass)
Presents the range of social, psychological, and ethical issues related to human aging and discusses the roles that public health could play in influencing the consequences of population aging. Topics include institutionalized perceptions of aging and productivity and vitality in late life. (2.5 credits)

HSB 231c. Community Intervention Research Methods (G. Sorensen)
Provides students with skills in intervention research design and methodology. Reviews phases of research for community studies, applies theoretical models to intervention and evaluation design, and links study design to intervention planning. Topics include community linkages to intervention research planning and implementation, community-originated research and participatory research methods, qualitative/formative research, evaluation design issues for intervention research, and measurement of outcomes. (2.5 credits)

HSB 240ab. Social and Behavioral Research Methods I (S. Gortmaker)
Covers aspects of social and behavioral research methods, including research design, measurement, sampling, data collection, and testing of causal theories. (5 credits)

HSB 241cd. Social and Behavioral Research Methods II (T. Glass, L. Berkman)
Provides students with an opportunity to develop a research protocol following an NIH format, including describing the sample, measures, study design, and analytic techniques. Students prepare written proposals for field methods, budgets, and budget justifications for review according to the format of an NIH site visit. (5 credits)

HSB 249b. Approaches to International Tobacco Control (I. Kawachi, K. Emmons)
Prepares students to apply training in epidemiology, statistics, management, and policy to the development of public health programs to curb tobacco use. Topics include tobacco industry global structure, marketing, and political strategies. (2.5 credits)

HSB 250b. Inequality and Health (I. Kawachi, B. Kennedy)
Reviews, from economic, political, and sociologic perspectives, the major theories of social stratification; examines the epidemiologic evidence on social class, gender, and racial disparities in health and illness; and develops an interdisciplinary approach to analyzing the problem of inequality. (2.5 credits)

HSB 269ab, HSB 270cd. Doctoral Seminar on Health and Social Behavior (S. Gortmaker)
Outlines the major questions pursued by doctoral students in health and social behavior. (1.25 credits)

HSE 282t. Developing Questionnaires to Measure the Outcomes of Health Care (T. Inui, G. Connelly, E. Cook)
Emphasizes concepts, methods, and measures for assessing patients' health status and outcomes of care. Reviews qualitative and quantitative approaches to developing measures, and presents some statistical methods. (2.5 credits)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research, undertake specialized readings, perform field projects, or carry out independent studies.

Guenther Rauh and Astrid Rauh-Pfeiffer
Master's Students
Department of Health Policy and Management

Astrid Rauh-Pfeiffer and Guenther Rauh came from the University of Munich, Germany, to pursue degrees in health policy and management. Astrid is a pediatrician with an interest in nutrition, while Guenther is a cardiologist seeking to broaden his management experience. With Germany changing from socialized medicine to a competitive health care system, both recognize the need for training in health policy research.

Recently, they became parents of a child their colleagues call "the school of public health baby." They now balance parenthood with studies. "Everybody at the school has been supportive of our being new parents," they agree. Having shared classes together, they find the academic atmosphere stimulating, particularly during the intensive summer courses.

Professionals before they began their studies at HSPH, Astrid continues her work with pediatrics at MIT and Children's Hospital, and Guenther focuses on quality of life research as related to life expectancy. Both will continue their professional careers in Germany.

The Department of Health Policy and Management is a mission-oriented department concerned with improving the health care delivery system and mitigating public health risks in the United States and abroad. The department is dedicated to resolving major management and health policy problems through original research, advanced training, and dispute resolution.

Research priorities in the Department of Health Policy and Management are organized into eight broad areas: *health financing and insurance,* including the creation of new physician payment systems and the design of public policies dealing with rising insurance premiums; *management of health hazards*, for example by using risk assessment to set priorities for environmental health protection; *management of health care organizations,* including the application of corporate strategic planning concepts to the challenges faced by health systems and pharmaceutical firms; *management and evaluation of medical technology,* including the meta-analysis of data from clinical trials; *business and labor in health,* including the negotiation of occupational safety and health care benefits in the collective bargaining process; *international health,* including evaluation of the cost-effectiveness of health programs in developing countries; *quality of health care,* including the design of better methods to measure quality; and *health care reform,* which includes the development of partnerships between the department and the corporate community to explore critical aspects of health policy and management.

The department's problem-solving orientation is exemplified by its strong ties to leading health practitioners in hospitals, HMOs, community health centers, health advocacy groups, corporate medical departments, health and environmental consulting firms, state and local health departments, legislative committees, federal regulatory agencies, and international agencies. Practical problem-solving skills are emphasized by an interdisciplinary faculty that includes management specialists, decision analysts, accountants, physicians, lawyers, policy analysts, economists, political scientists, and program evaluators.

The department has developed an effective job placement mechanism for its students that includes numerous contacts with potential employers on a national scale. Practitioners are invited to the department to discuss their work and career paths, and a system of faculty networking and professional contacts is used to link students with a broad range of health policy makers and executives.

Faculty

Department Chair: Arnold M. Epstein, AM (Harvard University), MD (Duke University); John H. Foster Professor of Health Policy and Management. Access and quality of care, especially in disadvantaged populations.

Robert J. Blendon, MBA (University of Chicago), MPH, ScD (Johns Hopkins University); Professor of Health Policy and Management. Politics of health care; access to health care; approaches to health care reform; influence of public opinion in shaping health policy.

Peter I. Buerhaus, MS (University of Michigan), PhD (Wayne State University); Assistant Professor of Health Services Administration. Cost-effective use of the nation's supply of registered nurses.

Paul H. Campbell, MPA (Portland State University), SD (Harvard University); Lecturer on Management. Financial management, strategic planning, and reimbursement systems; health services in developing countries.

Karen Donelan, MEd, SD (Harvard University). Assistant Professor of Health Policy and Management. Survey research methods; comparative international health system analysis; access to health services and insurance; electronic sources of consumer information.

Harvey V. Fineberg, MD, MPP, PhD (Harvard University); Professor of Health Policy and Management and Provost of Harvard University. Technology assessment; cost effectiveness and decision analysis; AIDS policy, prevention, and education; vaccine evaluation and policy; health care reform.

Susanne J. Goldie, MD (Albany Medical College), MPH (Harvard University); Assistant Professor of Health Decision Science. Development of disease-specific transition models; quality of life assessment for individuals and populations; cost-effectiveness analysis of preventive medical interventions; programming methods in clinical decision modeling.

John D. Graham, AM (Duke University), PhD (Carnegie-Mellon University); Professor of Policy and Decision Sciences and Director of the Harvard Center for Risk Analysis. Environmental protection; prevention of intentional and accidental injury.

As described below, the department offers both a four-semester and a two-semester Master of Science (SM) program; a non-residential, part-time Master of Science program in Health Care Management for Physicians; a Doctor of Science (SD) program; and participates in a university-wide Doctor of Philosophy (PhD) program in health policy, offered under the auspices of the Graduate School of Arts and Sciences. In addition, the department cosponsors study in Environmental Science and Risk Management with the Department of Environmental Health (see page 27). Please refer to pages 9 and 10 for information about the Master of Public Health concentrations in Health Care Management and Law and Public Health.

Master of Science in Health Policy and Management (four-semester program)

The four-semester SM program is designed for students who are building professional careers in health-related fields and who aspire to leadership roles in the public or private sector. The program emphasizes professional skills and concepts, a solid grounding in the substance of health problems, rigorous quantitative training, and a curriculum that combines professional, academic, and clinical activities. Acquired knowledge is applied to practical situations through a required summer internship program and an applied field research program.

Recent graduates have taken such positions as research analyst for Mathematica Policy Research and Alkermes, Inc.; program assistant for health at the Commonwealth Fund; client manager at Benchmarking Partners; analyst at Covance, Inc.; consultant with Deloitte & Touche LLP, Ernst & Young LLP, Arthur Andersen LLP, and William M. Mercer; as well as positions with Blue Cross/Blue Shield, Decision Resources, Neighborhood Health Plan, Partners Healthcare System, Kaiser Permanente, and Smithkline Beecham. Others have gone on to doctoral and fellowship programs.

Applicants come from a wide variety of undergraduate fields. They are expected to have work experience and an academic record, particularly in quantitative and analytical courses, that suggest outstanding potential in the areas of health policy and management. Applicants should have at least two years of relevant post-baccalaureate work experience in the health field; exceptions are occasionally made for outstanding candidates. Deferred admission is available for applicants who demonstrate strong potential but who lack sufficient professional experience in the health sector. These applicants work within the health field in positions approved by the program for a minimum of one year before matriculating.

Of the 80 credits necessary to earn the SM, required courses account for 30 to 35. All students take courses in epidemiology, statistics, environmental health, health and social behavior, and economics. In addition, students must satisfy the requirements of at least one of the three areas of interest described below. *The Guide to the Two-Year Master of Science Program,* available from the department, describes the requirements for each area of interest. Second-year students are encouraged to enroll in relevant courses at Harvard Business School, John F. Kennedy School of Government, and Harvard Graduate School of Education.

Management This area of interest is designed for students pursuing management careers in public or private sector health institutions. The course work gives students a range of managerial skills, including planning, marketing, managed care, financial analysis, cost accounting, budgeting, strategic planning, information systems, operations management, payment systems, economics, and organizational behavior, and tailors the use of these skills to the health setting. Required courses for this area include EPI 200, *Principles of Epidemiology*; BIO 219, *Statistical Methods for HPM*; BIO 225, *Multiple Regression Analysis for HPM*; or HPM 206, *Economic Analysis*; a course in both environmental health and health and social behavior; and HPM 290, *Applied Research and Practice in HPM*; plus an additional 17.5 credits from a list of selected courses on management and analysis and 5 credits from a list of selected courses on policy.

Policy This area of interest is designed for students who wish to become involved in the formulation of health policy, including such areas as medical care policy at local, state, and national levels; health finance and insurance; access to health care; reimbursement policies to institutions and practitioners; medicaid and medicare reform; injury control; mental health; and substance abuse.Required courses for this area include EPI 200, *Principles of Epidemiology*; BIO 219, *Statistical Methods for HPM*; BIO 225, *Multiple Regression Analysis for HPM*; HPM 206, *Economic Analysis*; HPM 207, *Econometrics for Health Policy*; HPM 208, *Health Care Regulation and Planning*; a course in both environmental health and health and social behavior; and HPM 290, *Applied Research and Practice in HPM*; plus an additional 17.5 credits from a list of selected courses on policy and 5 credits from a list of selected courses on management. The variety of recommended electives permits students to acquire additional skills in areas such as epidemiology and quantitative policy analysis and to develop specialties in specific health problems.

Research This area of interest is designed for students looking toward doctoral education and research careers in fields such as health economics, quality of care, technology assessment, health decision analysis, cost-effectiveness analysis, cost-benefit analysis, and advanced statistical analysis.Required courses for this area include EPI 200, *Principles of Epidemiology*; BIO 219, *Statistical Methods for HPM*; BIO 225, *Multiple Regression Analysis for HPM*; HPM 206, *Economic Analysis*; HPB 280, *Decision Analysis for Health and Medical Practices,* or HPM 286, *Decision Analysis in Clinical Research*; HPB 282, *Cost-Effectiveness and Cost-Benefit Analysis in Public Health and Medicine*; a course in both environmental health and health and social behavior; and HPM 290, *Applied Research and Practice in HPM,* or HPM 287, *Research Seminar on Risk and Decision Analysis.* Students also take at least 5 credits from a list of selected courses in statistics and data analysis and 5 credits from a list of selected courses in policy and management. Recommended elective courses include those on survey research, epidemiologic research, economic analysis, financial analysis, and quality assessment.

Master of Science in Health Policy and Management (two-semester program)

The two-semester SM program is designed for students pursuing research careers in public or private sector health care institutions, particularly for physicians (and other candidates with relevant advanced degrees) who desire an intensive exposure to analytic and quantitative skills. The degree is appropriate for students interested in either domestic or international research questions. Recent graduates have taken research positions at academic medical centers and other health care organizations.

Applicants should hold graduate medical or other professional degrees and have significant experience in health services. They typically expect to devote a substantial portion of their careers to research, particularly in areas such as health services research, cost-effectiveness analysis, and clinical decision-making.

Required courses for the degree include BIO 200 or 201, introductory biostatistics, or BIO 206, *Statistical Principles in Medical Research*; EPI 200 or 201, introductory epidemiology, or EPI 208, *Introduction to Clinical Epidemiology*; up to 10 tutorial credits; and an additional 10 credits in courses within the department. Recommended electives include upper-level courses in biostatistics, epidemiology, health economics, health services research, health decision sciences, quality improvement, technology assessment, and program evaluation.

Non-residential, part-time Master of Science in Health Care Management for Physicians

This 40 credit, two-year, part-time degree program trains clinicians in the executive skills required for management. These skills include strategic planning, goal-setting,

For more information about SM and SD programs in Health Policy and Management, please contact Kristine L. Forsgard, Deputy Director of Academic Programs, Department of Health Policy and Management, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4511
Fax: 617-432-4494
E-mail: kforsgar@hsph.harvard.edu
www: www.hsph.harvard.edu/hpm

George M. Gray, MS, PhD, (University of Rochester). Lecturer on Risk Analysis. Risk characterization to inform policy decisions; risk assessment and right-to-know; analysis of food safety; interpretation of rodent cancer bioassays for human health risk assessment.

James K. Hammitt, SM, MPP, PhD (Harvard University); Associate Professor of Economics and Decision Sciences. Mathematical modeling and analysis of economic behavior and decision making under uncertainty, with applications to valuation, regulation, and management of health and environmental quality.

David Hemenway, AM (University of Michigan), PhD (Harvard University); Professor of Health Policy and Director of the Harvard Injury Control Research Center. Intentional and unintentional injury; health care economics.

William C. Hsiao, MPA, PhD (Harvard University); K. T. Li Professor of Economics; Member of the Faculty, Harvard Business School. Health care systems; control of health care costs; universal insurance coverage.

Nancy M. Kane, MBA, DBA (Harvard University); Lecturer on Management. Financial health and competitive strategies of health care organizations; provider behavior under third-party payment systems.

Jack Kasten, MPH (University of Michigan), JD (Boston College); Lecturer on Health Services. Managed care; service utilization; manpower issues; hospital organization and management.

Karen M. Kuntz, SM, SD (Harvard University); Assistant Professor of Health Decision Science. Cost-effectiveness analysis of cancer screening strategies and development of disease-specific multiattribute utility scales.

For more information about the Master of Science degree in Health Care Management, please contact Sharon O'Brien, Program Administrator, 677 Huntington Avenue, Boston, MA 02115
Phone: 617-432-4324
E-mail: smobrien@hsph.harvard.edu
www: www.hsph.harvard.edu/mhcm

For more information about the PhD program, including financial aid, please contact Joan P. Curhan, Director, PhD Program in Health Policy, 79 John F. Kennedy Street, Cambridge, MA 02138.
Phone: 617-496-5412
Fax: 617-496-9053
E-mail: Joan_Curhan@harvard.edu
www: www.fas.harvard.edu/~healthhpl

Leonard J. Marcus, MSW (University of Wisconsin), PhD (Brandeis University); Lecturer on Public Health Practice. Negotiation, conflict resolution, and use of mediation in health care settings; effects of conflict on health care decision-making and outcomes.

Jack Needleman, MA (Syracuse University), PhD (Harvard University); Assistant Professor of Economics and Health Policy. Health economics and health policy; econometrics; research design and evaluation; applied policy analysis; management of the policy process; hospital finance.

Peter J. Neumann, MA (University of Pennsylvania), SD (Harvard University); Assistant Professor of Policy and Decision Sciences. Cost-effectiveness analysis in health and medicine, pharmacoeconomics, medical technology assessment, and federal and state health policy on pharmaceuticals and medical technology.

Joseph P. Newhouse, PhD (Harvard University); John D. MacArthur Professor of Health Policy and Management in the Faculties of Medicine, Government, Public Health, and Arts and Sciences; Director of the Harvard University Division of Health Policy Research and Education; and Chair of the Committee on Higher Degrees in Health Policy. Financing and organization of medical care; medical malpractice; manpower policy; outcome research.

financial analysis, negotiation, and designing measurement and reward systems. This program is targeted to mid-career MDs with significant management responsibilities who wish to be more effective in their managerial role in the health care sector.

Degree candidates are required to spend three weeks each July on campus, as well as five four-day weekends (Friday-Monday) each academic year. In addition, there will be monthly teleconferences, an estimated 10-15 hours per week of assignments, and a final practicum.

This is a closed cohort learning situation. Attendance at all sessions is mandatory, and previous courses and/or degrees will not be applied to degree requirements. No auditing or cross-registration is allowed.

Doctor of Science in Health Policy and Management

The SD program in Health Policy and Management is designed for physicians and lawyers who are interested in doctoral-level research training in health policy, and who are committed to applied, interdisciplinary research. The program prepares graduates to perform research in the academic or professional realm.

Candidates complete a set of required courses in epidemiology, biostatistics, decision science, economics, program evaluation, health politics, and public health law (lawyers only). In addition, each student works closely with a faculty advisor to develop an individual plan of study. While students in this program have the opportunity to take courses throughout the university, all required courses are offered through HSPH. Candidates normally complete two academic years of study in residence at HSPH, pass a written departmental general examination and an oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and complete, defend, and submit a thesis for publication. The doctoral thesis, advised by a faculty committee of three or more members, is normally comprised of three publishable papers.

Applicants must hold an MD, JD, or other terminal professional degree. In addition, applicants should have a strong aptitude in a quantitative discipline (demonstrated by prior academic performance, work experience, and standardized test scores from the GRE, MCAT, or LSAT), experience in the health sector, and the ability to perform original and independent work. Applicants should indicate their anticipated area of concentration within the department and anticipated faculty mentor (if known) in their application essay.

Doctor of Philosophy in Health Policy

The PhD in Health Policy, awarded by the Faculty of Arts and Sciences, is designed for students seeking teaching careers in institutions of higher learning (schools of public health, public policy, and medicine) and/or research careers in health policy. It is a collaborative program of four Harvard University faculties: the Graduate School of Arts and Sciences, the School of Public Health, the Medical School, and the John F. Kennedy School of Government. Because this is an interfaculty program, enrolled students take courses throughout the university.

Students select one of the following six concentrations within health policy: decision science, economics, ethics, organizational behavior, political analysis, or statistics and evaluative science. In addition, at the dissertation stage, students specialize in one of four policy areas: environmental health, health care services, mental health, or public health.

Applicants must take the GRE. In addition, applicants whose native language is not English must take the TOEFL.

Application materials must be obtained from the Graduate School of Arts and Sciences at 8 Garden Street, Cambridge, MA 02138 (phone: 617-495-5315, E-mail: adm@hugsas.harvard.edu).

Postdoctoral Fellowships in Health Policy and Management

The Department of Health Policy and Management offers two-year postdoctoral fellowships to physicians, dentists, and nurses who have earned a PhD, who wish to do independent research in such areas as quality of medical care, technology assessment and cost-effectiveness, health care policy, management of health care organizations, and AIDS policy. The program emphasizes methodology in evaluation research, decision science, economics, and organizational analysis, and permits fellows to design individualized programs of study. Fellows may also apply for admission to a formal degree program.

Candidates must hold an MD, DDS, or equivalent degree, and must be US citizens or permanent residents. Applicants must submit a curriculum vitae, three letters of reference, and a statement describing career goals, research interests, and reasons for applying. The application deadline is November 5, 1999, for a fellowship beginning in July, 2000. For more information, contact Kristine L. Forsgard in the Department of Health Policy and Management.

Courses Offered by the Department of Health Policy and Management, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

HPM 201b. Pharmacoeconomics and the Economic Evaluation of Medical Technology (P. Neumann)
Examines key issues in the use of economic information for the evaluation of pharmaceuticals and other medical technologies. Emphasizes applications of analytic techniques in a variety of disease areas. Discusses the FDA's role and the use of pharmacoeconomic information in coverage and reimbursement decisions by managed care plans. (2.5 credits)

HPM 202s. The Role of the Physician Manager in Health Care (T. Lee)
Examines the major managerial roles for physicians in the arena of health care delivery. Topics include market forces, quality improvement and re-engineering in an acute care hospital, building an integrated delivery system, the changing role of payers, guideline development and implementation, and medical management under capitation. (2.5 credits)

HPM 205ab. Economic Analysis for Public Health (M. Roberts)
Introduces basic principles of economics and economic analysis, particularly as they apply to public health. Covers such aspects of microeconomic theory as determinants of supply and demand, the theory of markets, economic efficiency, and other topics in health care economics. (5 credits)

HPM 206ab. Economic Analysis
Brings students to an intermediate-level understanding of microeconomic theory. Emphasizes the uses and limitations of the economic approach. (5 credits)

HPM 207ab. Econometrics for Health Policy (C. Yip)
Provides students with an understanding of econometric concepts and methods used in health policy research. Gives special attention to modeling and model specification issues. (5 credits)

HPM 208cd. Health Care Regulation and Planning (K. Swartz)
Examines issues for US health care reform: insurance, financing, cost-control methods, incentives for hospitals and physicians, quality of care, long-term care, competitive versus regulatory approaches, and the roles of government and the private sector. (5 credits)

HPM 209s. The Economics of Health Policy
Teaches the analysis of health policy issues through the application of basic economic principles. Topics include health insurance, the role of taxation and regulation in promoting public health, hospital mergers, an overview of cost-effectiveness analysis, implications of the growth in for-profit health care providers, and health care reform. (2.5 credits)

HPM 210d. Medical Malpractice and Risk Management (B. Moulton)
Focuses on the development, implementation, and evaluation of risk management programs and legislative reforms in patient compensation plans. Emphasizes the relationships among quality of care standards, quality assurance, malpractice vulnerability, and risk management programs. (2.5 credits)

R. Heather Palmer, MB, BCh (Cambridge University), SM (Harvard University); Lecturer on Health Services and Director of the Center for Quality of Care Research and Education. Quality of health care; incorporation of evaluation measures into health care reform plans.

Deborah B. Prothrow-Stith, MD (Harvard University); Professor of Public Health Practice and Associate Dean for Faculty Development. Community-based violence prevention; violence prevention protocols for primary care settings.

Lorenz R. Rhomberg, PhD (State University of New York at Stony Brook); Assistant Professor of Risk Assessment (Health Policy and Management and Environmental Health). Critical analysis of the methods and procedures of human risk assessment, especially quantitative methods for putative carcinogens.

Marc J. Roberts, PhD (Harvard University); Professor of Political Economy. Health policy; environmental policy; ethical aspects of allocating scarce public health resources.

Meredith Rosenthal, PhD (Harvard University); Assistant Professor of Health Economics and Policy. Empirical studies of the impact of financial incentives and organization on physician behavior; econometric models of health care provider behavior; application of methodological innovations for the estimation of causal effects in non-experimental research.

Katherine Swartz, MS, PhD (University of Wisconsin); Associate Professor of Health Policy and Management. Analyzing populations without health insurance; developing policies to finance universal health insurance; structures of financial incentives for physicians.

Alvin R. Tarlov, MD (University of Chicago); Professor of Health Promotion. Health outcomes assessment in individuals and population groups.

Kimberly M. Thompson, MS (Massachusetts Institute of Technology), SD (Harvard University); Assistant Professor of Risk Analysis and Decision Science. Analysis of the risks, costs, and benefits of using airbags as lifesaving devices; applications of value of information (VOI) techniques to environmental health decisions; regulatory developments in the dry cleaning and pulp and paper industries; variability in the dispersion of pollutants with respect to the distribution of population surrounding the source.

Milton C. Weinstein, AM, MPP, PhD (Harvard University); Henry J. Kaiser Professor of Health Policy and Management (Health Policy and Management and Biostatistics); Professor of Medicine, Harvard Medical School. Cost-effectiveness of health practices and technologies.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Donald M. Berwick, MPP, MD; Associate Professor in the Department of Health Policy and Management. Health care quality assessment, management, and improvement; technology assessment and cost-effectiveness analysis; decision analysis and clinical epidemiology; preventive medicine and clinical preventive practice.

Troyen A. Brennan, MA (Oxford University), JD, MPH, MD (Yale University); Professor in the Department of Health Policy and Management. Medical ethics; personal injury and environmental litigation; medical malpractice and health policy reform.

David J. Cohen, MD, SM (Harvard University); Assistant Professor in the Department of Health Policy and Management. Application of health outcomes research and cost-effectiveness analysis to interventional cardiology.

Deborah J. Cotton, MD (Boston University), MPH (Johns Hopkins University); Associate Professor in the Department of Health Policy and Management. Clinical epidemiology of HIV infection; HIV/AIDS in women; health science policy related to HIV/AIDS clinical research.

Robert A. Greenes, MD, PhD (Harvard University); Professor in the Department of Health Policy and Management. Medical informatics; design and development of a modular approach to knowledge management; facilitating integration of the work of multiple contributors.

John Hedley-Whyte, MB, BChir, MA, MD (Cambridge University); Professor in the Department of Health Policy and Management. Standards for medical equipment and services.

Matthew H. Liang, MD, MPH (Harvard University); Professor in the Department of Health Policy and Management. Epidemiology of rheumatic disease and disability; clinimetrics; health services research; technology assessment.

HPM 211abcd. New Developments in Health Law (T. Brennan, M. Chirba-Martin, D. Studdert)
Explores recent developments in legal issues pertaining to public health, focusing on topical decisions, bills being debated in Congress, newly enacted statutes, issues related to medical ethics, and developments in corporate and antitrust law. (1.25 credits)

HPM 212ab. Program Evaluation in Health Policy (J. Needleman)
Examines issues in health program evaluation, with an emphasis on accuracy, relevance, and credibility of findings. Topics include establishing the scope of an evaluation, data and measurement issues, inference, and presenting and applying findings. (5 credits)

HPM 213b. Introduction to Law and Public Health (T. Brennan, A. Noble, M. Chirba-Martin)
Explores the relationship between US constitutional protections of individual rights, and the need to use the police power of the state to address public health problems. Includes emphasis on the HIV epidemic and an overview of international legal issues. (2.5 credits)

HPM 214cd. How to Regulate: Case Studies in Federal, State, and Local Regulation of Health Care (P. Green, A. Hyams)
Focuses on the legal oversight of the US health care system. Contrasts regulation of provider activity with market-based approaches and examines the effects of tort law on provider behavior and alternatives to traditional legal structures. (2.5 credits)

HPM 217cd. Advanced Topics in Health Law and Policy (T. Brennan)
Provides an overview of the law of health care institutions, emphasizing recent developments. Topics include new payment methods and insurance forms, antitrust litigation, rationing mechanisms, and the role of health plan purchasing cooperatives in the future of medical care. (5 credits)

HPM 219a. Financial Transactions and Analysis (N. Kane)
Introduces concepts of financial accounting for the nonaccountant user of financial information. Focuses on basic accounting transactions, statement preparation, accrual accounting, accounting for capital, and financial analysis in a variety of health care organizations. (2.5 credits)

HPM 220b. Financial Management and Control (R. Siegrist)
Introduces cost accounting and management control concepts and their uses in health service organizations. Topics include cost accounting, management control structure and process, responsibility accounting, budgeting, reporting, and variance analysis. (2.5 credits)

HPM 221ab. Management in Public Health in Industrialized Countries (M. Roberts, C. Koeck)
Explores the management of health delivery organizations in industrialized countries. Topics include organizational issues, financial management, cost accounting, management control systems, and institutional strategy. (5 credits)

HPM 222d. Financial Management of Health Care Organizations (D. Puhy)
Continues the study of financial management begun in previous courses, focusing on a range of health care organizations. Topics include financial management of working capital, investment decision models, long-term capital structure, and mergers and acquisitions of health care organizations. (2.5 credits)

HPM 223b. Public Speaking for Managers (N. Kane, P. Campbell)
Provides students with the opportunity to develop skills in oral communication. Emphasizes techniques most useful to managers. (1.25 credits)

HPM 224c. Analyzing National Health Policy: An International Comparative Perspective (M. Roberts, K. Donelan, C. Koeck)
Provides students with the skills needed to analyze proposed changes to an industrialized country's national health policies. Examines questions facing countries that relate to the control of technology, hospital investment, the supply and distribution of physicians, access to care, and the role of prevention in the financing of health care. (2.5 credits)

HPM 225d. Legal and Ethical Issues in the AIDS Epidemic (Z. Lazzarini)
Examines the legal and ethical issues raised by the HIV/AIDS epidemic, including ways that social issues, such as discrimination, have influenced the epidemic, and the relative roles of voluntarism and coercion in public health strategies. Other topics include the shift in epidemiology as HIV/AIDS affects increasing numbers of women, children, and minorities and the design of prevention programs in an imperfect world. (1.25 credits)

HPC 226e. Urban Violence in America (D. Prothrow-Stith, F. Earls)
Examines the causes and possible remedies for the epidemic of urban violence in the US. Emphasizes the public health approach to violence prevention. (1.25 credits)

HPM 227cd. The Economics of Health Policy (J. Newhouse)
Considers policy issues related to Medicare reimbursement, malpractice, the aggregate number and distribution of physicians, and the demand for medical care services and insurance. (5 credits)

HPM 228cd. Introduction to the New American Health Care System: Law, Policy, and Management (G. Moseley)
Examines the organizations, structures, and relationships intrinsic to the US health care system's reformation. Identifies the key delivery entities (HMOs, PPOs, MSOs, IPAs, PHOs, and more) and their purposes, advantages, and disadvantages in the context of strategies being implemented by doctors, hospitals, insurers, and employers. Discusses the influences of federal and state government agencies. (2.5 credits)

HPM 230cd. Managing People in Health Care Organizations (G. Moseley)
Explains the basic systems and strategies for managing human resources in health care delivery organizations, including principles of recruitment, management, and supervision. Stresses the role of labor unions, management of staff relations, and downsizing. (5 credits)

HPM 231d. Competitive Strategy Determination (D. Moriarty)
Focuses on the conceptual framework needed to plan for the long-term viability of health care organizations. Students learn to appreciate the concepts of competitive strategy and competitive advantage and gain the tools and skills to formulate and evaluate organizational strategy. (2.5 credits)

HPM 232c. Operations Management in Service Delivery Organizations (E. Litvak)
Examines the role of operations in an organization. Topics include process and capacity analyses, types of processes, productivity, quality standards, and operating strategy. (2.5 credits)

HPM 233d. Strategic Marketing Management in Health Systems (G. Wasek)
Examines marketing within a strategic framework across the public and private sectors, domestic and international health systems, and social marketing contexts. Marketing management, research, and strategy techniques are discussed and applied to program design, business planning, and implementation issues. (2.5 credits)

HPM 235b. Policy Issues in Managed Health Care: Policy and Public Management Issues (N. Turnbull)
Examines the concepts, programs, and policy of managed care in the context of current health care reform proposals at state and national levels. Focuses on forms that managed care products take and their intended achievements, the ways these forms are viewed by the market, and their effect on costs, health outcomes, and buyer satisfaction. The prospect of using managed care to control national health spending and to improve access and quality of care is also discussed. (2.5 credits)

HPM 238c. Strategic Use of Information Systems in Health Care Delivery (J. Nobel)
Explores information systems from the perspectives of providers, payers, and consumers. Topics include computerized patient records, repository databases, clinical decision support systems, and interactive multimedia communications. (1.25 credits)

HPM 239bcd. Applied Financial Analysis of Health Care Organizations (N. Kane)
Builds skills by assigning students a set of health care organization financial statements to analyze as a group before breaking into smaller groups to pursue student-defined financial-research questions. (3.75 credits)

ID 240c. Principles of Injury Control (D. Hemenway)
Introduces the problem of intentional and unintentional injury, including motor vehicle crashes, fires, and violence. Examines control options, methods for evaluating prevention programs, and determination of the optimal combination of countermeasures. (2.5 credits)

HPM 241ab. Health Care in the US: System, Policy, and Comparative Perspectives (J. Akula)
Examines the organization of the US health care system, the current policy debate about health care reform, and ways in which health care systems of other industrialized nations provide insight into the US experience. (5 credits)

HPC 242c. Politics and Strategies for Change in Health Policy (R. Blendon)
Focuses on development of strategies to influence public policy in order to improve the health of populations. Topics include the politics of health care, political strategy, lobbying and interest groups, the media and public opinion, campaigns, the effects of campaigns and elections on health care policy, coalition building, and grass roots advocacy. (2.5 credits)

Richard F. Mollica, MD (University of New Mexico), MAR (Yale University); Associate Professor in the Department of Health Policy and Management. Survey instruments for traumatized populations; crosscultural psychiatry and psychiatric epidemiology; international health policy.

Jane C. Weeks, MD, SM (Harvard University); Associate Professor in the Department of Health Policy and Management. Outcomes of cancer treatment; effectiveness of resource utilization in medical oncology; medical decision-making in oncology.

Adjunct Faculty

Donald S. Bialek, MD, SM, MPH. Private consultant in medical informatics.

David E. Burmaster, MPP, PhD. Consultant, Alecon, Cambridge, MA.

S. Philip Caper, MS, MD; Chairman, Chief Executive Officer, and President, The Codman Research Group, Inc.

Gail Charnley, PhD. Scientist, Energy Resources Company, Cambridge, MA.

Mark G. Field, AM, PhD; Professor of Sociology, Emeritus, Boston University.

Kenneth A. Freedberg, MD, SM; Associate Professor of Biostatistics and Epidemiology, Boston University School of Public Health.

Pamela S. Green, JD; private consultant on health law and policy.

Sheldon Greenfield, MD; Professor of Medicine, Tufts University.

Maria G. M. Hunink, MD, PhD; Professor in Clinical Epidemiology, Erasmus University Medical School. The Netherlands.

Andrew L. Hyams, JD, MPH; Senior Policy Associate, Urban Health Institute, Boston Department of Health and Hospitals.

Sherrie H. Kaplan, MPH, MSPH, MS, PhD; Adjunct Associate Professor of Medicine, Tufts University School of Medicine.

Christian M. Koeck, MD, MPH, SM, SD; Executive Vice President, Vienna City Hospital Association, and Chair, Department of Organizational Development.

Zita Lazzarini, MPH, JD; private consultant.

Lucian L. Leape, MD; Adjunct Professor of Health Policy in the Faculty of Public Health.

Eugene Litvak, MS, PhD; Adjunct Lecturer.

George D. Lundberg II, MD, MS, ScD; Editor, *Medscape*.

John E. McDonough, MPH, PhD; Senior Associate, Institute for Health Policy, Brandeis University.

Daniel D. Moriarty, MBA; Vice President, Information Systems Group, John Snow, Inc.

George B. Moseley III, MBA, JD; Instructor, University Seminar Center.

Benjamin W. Moulton, MPH, JD; Executive Director, American Society of Law, Medicine and Ethics.

Jeremy J. Nobel, MD, MPH, SM; Medical Director, GTE Laboratories.

John A. Norris, JD, MBA; President and CEO of John A. Norris, Esquire, PC, a law and public affairs/relations consulting firm.

James L. J. Nuzzo, Managing Partner, The Colchester Group.

Joseph S. Pliskin, SM, PhD; Sidney Liswood Professor of Health Care Management, Ben-Gurion University.

Dorothy E. Puhy, MBA; Chief Financial Officer and Assistant Treasurer, Dana-Farber Cancer Institute.

Richard B. Siegrist, Jr., MS, MBA; Vice President and Chief Financial Officer, Transition Systems, Inc.

Nancy C. Turnbull, MBA; private consultant.

Glenn K. Wasek, SM; Vice President and Director, Marketing Group, John Snow, Inc.

HPM 243c. Health Economics: Economic Analysis of the Health Care System (W. Hsiao)
Introduces health economics, the use of economic analysis to examine major health care financing and delivery issues, and the development of policies and programs designed to address them. Topics include financing, access, utilization, cost control, market structure, and national health plans. (2.5 credits)

HPM 244d. Pharmaceutical and Biotechnology Industries: Public Policy and Regulatory Issues (J. Norris)
Analyzes public policy and legal issues in the pharmaceutical and biotechnology industries, stressing research and development of new biomedical products. Examines regulatory programs for new product development, the ethics of clinical investigation, and conflicts of interest. (1.25 credits)

HPM 245f. Public Health Leadership Skills (D. Prothrow-Stith, J. Kurland)
Provides students with concrete skills needed to lead health agencies. Topics include public speaking, articulation of goals, negotiation, budget development, and constituency building. (2.5 credits)

HPM 246abcd. Seminar In Health Policy (J. Newhouse)
Covers the financing and organization of health care, medical manpower, medical malpractice, technology assessment, prevention, mental health, long-term care, and quality of care. (10 credits)

HPM 247cd. Political Analysis and Strategy for US Health Policy (R. Blendon)
Analyzes the politics of major health policy development in the US and provides skills for developing strategies to influence policy outcomes. Topics include the influence of the press, pollsters, and political institutions on health policy, and the health politics environment in different countries. (5 credits)

HPM 249cd. Development of Federal Health Policy (J. Nuzzo)
Discusses the interplay of forces, both internal and external to government, which influence federal health policy decisions. Describes the actors and the policy development process. Develops skills in policy analysis, writing of memoranda, and government relations. (2.5 credits)

ID 250. Ethical Basis of the Practice of Public Health
ID250a. (M. Roberts, M. Reich)
ID250b. (M. Roberts)
Provides a broad overview of the main philosophical and moral ideas that are used to resolve debates of public health policy. Helps students develop the capacity to analyze, criticize, evaluate, and construct policy-oriented arguments. (2.5 credits)

ID 251s. Ethical Basis of the Practice of Public Health: Health Care Delivery (T. Brennan)
Emphasizes US health care policy and modern medical ethics to explore the political theory of medical care. Helps health professionals understand the manner in which political economy and ethics interact in health care policy decisions. (2.5 credits)

HPM 253t. Quality Improvement in Health Care (M. Bisognano, D. Berwick)
Explores theoretical and practical methods for improving health care systems by presenting clinical cases, organizational lessons, interactive learning modules, and site visits to health care settings. (2.5 credits)

HPM 254cd. Use of Patient-Based Assessments in Outcomes Research (A. Tarlov, J.E. Ware)
Provides research experience in the use of a large data set. Students choose from three options: 1) functional health outcomes of medical care (the Medical Outcomes Study); 2) National Survey of Functional Health Assessment in the US General Population; 3) the influence of work on health, and of health on work. Students complete independent research projects including analyses and a paper with interpretation of results, policy relevance, and conclusions. Didactic sessions cover scale construction, reliability, validity, data collection, interpretation, and analytic issues. (5 credits)

HPM 255d. Payment Systems (N. Kane)
Examines issues related to third-party reimbursement for health care institutions and individual providers. Issues include cost containment efforts, provider and policy perspectives, and managed care. (2.5 credits)

HPM 256c. Clinical Quality Measurement for Quality Improvement (R. Palmer, A. Lawthers, L. Peterson)
Introduces the terminology, concepts, methods, and strategies for clinical quality measurement in a variety of health care environments. Takes a rigorous analytic approach using epidemiologic methods. (2.5 credits)

HPM 257c. Use of Outcomes and Patient Satisfaction in Assessing Quality of Care (S. Greenfield, S. Kaplan)
Explores the principles and issues involved in using outcomes of care and patient satisfaction in evaluating quality of care, including an assessment of the major instruments and methods currently available. Topics include the relationship of process to outcome; the impact of setting on how outcomes are used; difference between the reporting, rating, and participating functions of the patient; and the role of provider satisfaction in outcome. (2.5 credits)

HPM 258d. Physician Performance (L. Leape)
Examines factors influencing physician practice, including training, experience, organizational setting, financial incentives, and patient preferences. Considers strategies for changing physician behavior, such as education, feedback, guideline development, and utilization management. (2.5 credits)

HPM 259. Quality Management in Health Care
HPM 259d. (D. Blumenthal, R. Bohmer)
HPM 259t. (R. Bohmer)
Introduces the concepts and tools of total quality management and their applications to health care. Reviews the data needs of quality management, the implications for information system planning, and the relationship between national health care policy as it relates to quality. (2.5 credits)

HPM 262c. How to Write, Review, and Publish Articles on Medicine and Health Policy (G. Lundberg, K. Donelan)
Teaches students to prepare, peer review, and revise articles for publication, while providing an overview of current health policy controversies. (2.5 credits)

HPM 266c. Seminar on Refugee Trauma and Human Development (R. Mollica)
Focuses on the public health problems of highly traumatized refugee populations. Provides a comprehensive overview of the international approach, theoretical models, and public health strategies for dealing with refugee crises. (1.25 credits)

HPP 268c. Financing Health Care in Developing Countries (W. Hsiao, P. Berman)
Provides an introduction to public and private financing of health care in developing countries. Analyzes economic considerations in alternative approaches to financing, reviews formal perspectives of economic theory, and assesses links between stages of national development and health care financing. (2.5 credits)

HPM 269b. Comparative Health Systems of Industrialized Societies (M. Field)
Undertakes a comparative examination of the health systems of industrial and urban societies in order to provide an understanding of shared features and critical differences. (2.5 credits)

HPM 270a. Mental Health Policy in the US
Examines the historical development and current status of policy issues relevant to mental health services in the US. Topics include deinstitutionalization of mental hospitals, privatization of psychiatric services, the role of federally funded community mental health centers, and the organization and financing of state mental health agencies. (2.5 credits)

HPM 271e. Overview of Domestic Violence (D. Prothrow-Stith, N. Isaac)
Covers the epidemiology of domestic violence, dynamics of abusive relationships, responses of the criminal justice and health care sectors, the role of the shelter and advocacy communities, relationships with other forms of violence, and strategies for primary prevention. (1.25 credits)

HPM 273a. Policy and Management Challenges in Public Health Practice (D. Prothrow-Stith, B. Kennedy)
Examines the theories and practice of leadership in public health. Focuses on the management, health policy, and interpersonal difficulties that can arise in leadership positions, and strategies for responding. (1.25 credits)

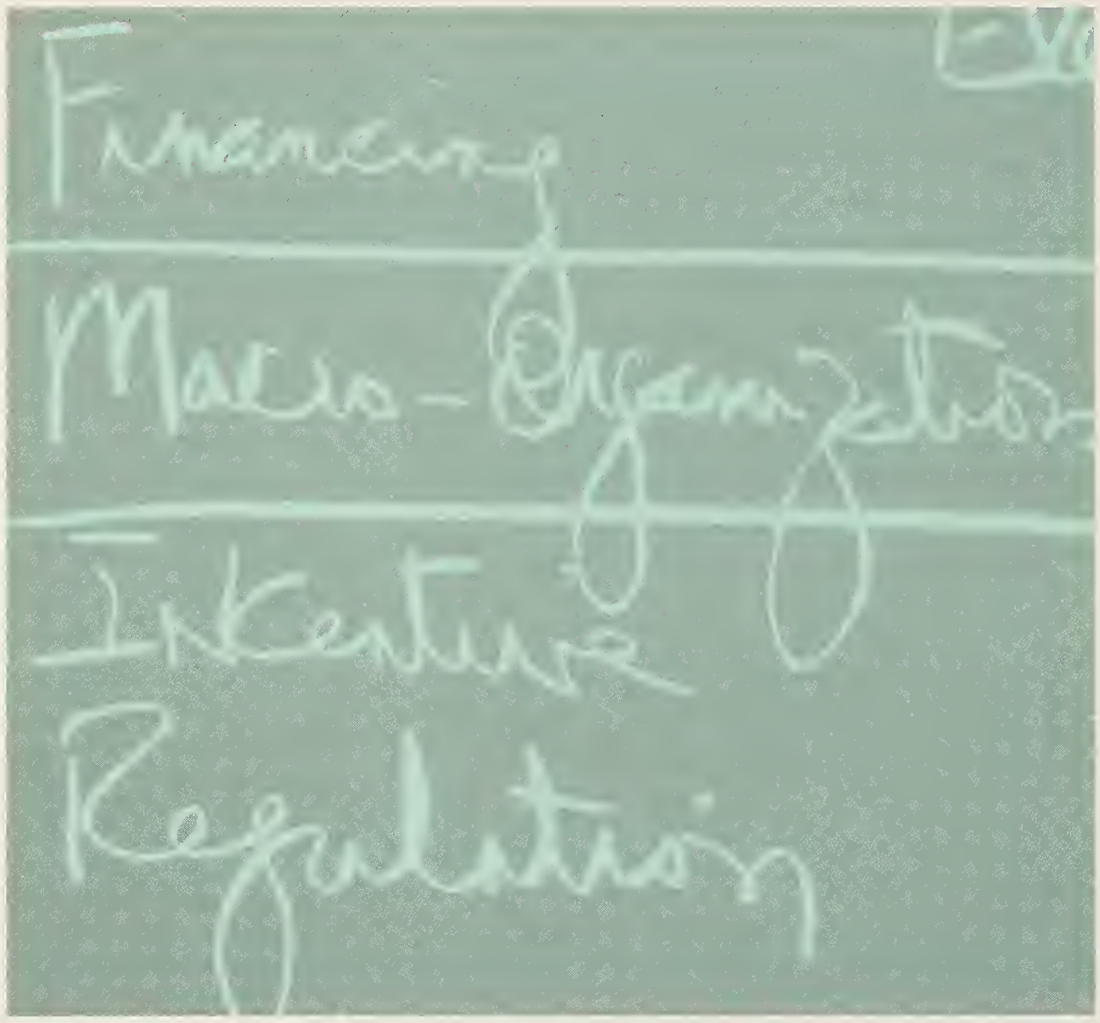
HPM 274abcd. Oral Health Policy Research Seminar (C. Douglass)
Concentrates in the fall term on the research methods of current national studies of the need, supply, demand, and cost of dental care. The spring term emphasizes research work on relevant dental care policy subjects. (5 credits)

HPM 275ab. Dental Public Health and the Dental Care Delivery System (C. Douglass)
Reviews basic concepts in dental public health and dental care delivery systems in the US and elsewhere. Examines issues of utilization of services, need versus demand for dental care, methods of quality assurance, and the role of government agencies in the provision and regulation of care. (2.5 credits)

HPM 276t. A Survey of Methods and Applications in Health Services Research (A. Epstein)
Covers the methodology and application of health services research. Topics include research design, analyses of large databases, cost-effectiveness analyses, survey methodology, assessment of health status, assessment of quality, measurement of access to care, risk adjustment, and statistical techniques of health services research. (2.5 credits)

HPM 277t. Current Issues in Health Policy (A. Epstein, A. Komaroff)
Provides an overview of the major health policy issues facing the US today. Focuses on roles of hospitals, doctors, private and government insurance, and different systems for organizing and financing care. (2.5 credits)

HPM 278d, 278e. Skills and Methods of Health Care Negotiation and Conflict Resolution (L. Marcus)
Presents the theory and practice of negotiation and conflict resolution with emphasis on integrating analytic skills, negotiation techniques, and conflict resolution methods into the practice of public health. (1.25 credits)



HPB 280b. Decision Analysis for Health and Medical Practices (S. Goldie)
Discusses the methods and applications of decision analysis, cost-effectiveness analysis, and benefit-cost analysis in health care technology assessment, medical decision making, and health resource allocation. (2.5 credits)

HPB 281c. Methods for Decision Analysis in Health Care Technology Assessment (K. Kuntz, M. Weinstein)
Covers methods and applications of decision analysis and other modeling techniques to clinical problems. Topics include Markov models, life expectancy modeling, deterministic and probabilistic sensitivity analysis, simulation models, ROC analysis and diagnostic technology assessment, quality of life valuation, multiattribute utility, and behavioral decision theory. (2.5 credits)

HPB 282d. Cost-Effectiveness and Cost-Benefit Analysis in Public Health and Medicine (J. Graham, M. Weinstein)
Covers methods and applications of cost-effectiveness analysis and includes cost-benefit analysis for health program evaluation, medical technology assessment, and environmental risk analysis. (2.5 credits)

HPE 284ab. Decision Theory (J. Hammitt)
Introduces the standard model of decision making under uncertainty and methodological issues created by applications to health research. Topics include von Neumann-Morgenstern and multiattribute utility theory, Bayesian statistical decision theory, stochastic dominance, the value of information, judgment under uncertainty, and alternative models of probability. (5 credits)

HPE 285d. Seminar on Risk Management and Communication (K. Thompson, J. Graham)
Challenges students to evaluate the risk analysis framework as an approach to managing health, safety, and environmental hazards. Addresses contemporary issues in risk assessment, evaluation, management, and communications. (2.5 credits)

HPM 286s. Decision Analysis in Clinical Research (M. Weinstein)
Introduces decision analysis methods relevant to clinical decision making and clinical research, the use of probability to express uncertainty, utility theory, diagnostic test use and evaluation, and uses of decision analysis in clinical decision making and research design. (2.5 credits)

HPM 287abcd. Research Seminar on Risk and Decision Analysis (J. Hammitt)
Introduces students to state-of-the-art scholarship in risk analysis and decision theory. Topics include theory and techniques of risk analysis, choice under uncertainty, health policy models, cost-effectiveness analysis, and statistical decision theory. (2.5 credits)

HPM 288c. Management Science (E. Litvak)
Introduces quantitative tools and methods to promote optimal use and allocation of scarce resources. Topics include linear programming, transportation, assignment, network flows, dynamic programming, queuing, and simulation. (2.5 credits)

HPM 289cd. Practicum in Decision Analysis and Cost-Effectiveness (K. Kuntz)
Enables students to design and undertake a research project in decision analysis or cost-effectiveness analysis on a topic of their choice. (2.5 credits)

HPM 290ab, 290cd. Applied Research and Practice in Health Policy and Management (N. Turnbull, G. Moseley, E. Litvak, P. Buerhaus)
Teaches students to apply analytic and managerial methods to concrete problems. Each student carries out a research project, conducts a policy analysis, or performs a management study on behalf of an individual or institutional sponsor. (5 credits)

HPM 291cd. Applied Research in the Law of Health Policy and Management (T. Brennan)
Allows students in the Law and Public Health concentration of the MPH degree program to apply analytic skills to a practical problem. Students carry out a research project, perform a policy analysis, or conduct a managerial study on behalf of an individual or institutional sponsor. (5 credits)

HPM 292d. Research Ethics (T. Brennan)
Reviews ethical issues that arise in the conduct of research. Topics include informed consent, disclosure of conflicts of interest, multiple authorship, issues in mentoring (including gender and race-

based discrimination), and federal oversight. Required for all students engaged in studies supported by the National Institutes of Health. (1.25 credits)

HPM 293d. Surveys for Health Policy (K. Donelan, R. Blendon)
Gives students experience in designing, conducting, analyzing, and reporting results of surveys relevant to health policy issues. Topics include defining issues, contracting with survey organizations, collecting objective and subjective data, sampling specialized populations, and presenting data in useful form. (2.5 credits)

HPM 294b. Methodology Issues in Health Services Research (S. Kaplan)
Emphasizes the array of methods available to health services researchers, their disciplinary origins, underlying assumptions, and strengths and weaknesses. (2.5 credits)

HPM 296cd. Doctoral Seminar in Health Economics (J. Newhouse)
Explores frontier work in the field of health economics. Focuses on advanced theories and economic models useful for policy analysis, and on development of research topics. (2.5 credits)

HPM 297cd. Public Opinion, Polling, and Public Policy (R. Blendon)
Explores the uses of public opinion polling in public policy decision making and media reporting. Students analyze and evaluate existing opinion surveys, design polling questions, and interpret public opinion results. (5 credits)

HPE 299d. Analytical Methods in Risk and Decision Sciences (K. Thompson)
Covers advanced methods for modeling and synthesizing information for analysis of health decision problems. Builds analytical and computational skills (with emphasis on simulation and uncertainty analysis) through the application of theory to real health and safety problems, both environmental and medical. (2.5 credits)

HPM 504b. Strategies for Managing Variable Patient Demand in Health Care Settings (N. Kane, E. Litvak)
Introduces a wide range of scenarios in which variable patient demand needs to be managed to reduce costs while maintaining or improving quality of care. Students are introduced to the quantitative techniques and logical methodology of solving these problems in different hospital departments. (1.25 credits)

HPM 510t. Introduction to Management of Health Care Organizations (M. Roberts)
Provides an introduction to two of the major tasks confronting managers of health care organizations. Builds on an introduction to organizational theory, and focuses on the main problems of organizational strategy and the management of human resources. (2.5 credits)

Independent Study, Field Experience
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research, undertake specialized readings, perform field projects, or carry out independent studies.

Annie Joseph
Master's Student
Department of Immunology and Infectious Diseases

After completing undergraduate studies in biology, Annie Joseph worked for a summer in Brazil with a community-based group that specialized in sanitation, nutrition programs, reforestation, and monitoring the viral infection, dengue fever.

Joseph wanted to continue studying dengue fever, a disease common in tropical areas because of its transmission via mosquitoes. "I looked for a public health school that would take me back into the field, provide project support, and help me launch my own pilot study," she says. After beginning her master's degree program at HSPH, she returned to Brazil to study population susceptibilities to dengue fever and subsequent manifestations.

"What makes it fascinating to me are the unique ways that different strains of dengue interact with the human immune system," says Joseph. "I find the bug to be really clever!"

The Department of Immunology and Infectious Diseases focuses on the biological, immunological, epidemiological, and ecological aspects of viral, bacterial, protozoan, and helminthic diseases of animals and humans and the vectors that transmit some of these infectious agents.

Research in the department emphasizes basic pathogenic mechanisms that may lead to better diagnostic tools, the development of vaccines and other immune interventions for prevention and control of infection and disease, and the identification of new targets for antiviral and antiparasite drugs. Laboratory-based research within the school may be supplemented by field-based studies of epidemiological and ecological aspects of infectious disease transmission and control. Diseases of developing countries are emphasized.

Members of the department take a multidisciplinary approach to infectious diseases, which includes immunology, molecular biology, public health entomology, cell biology and ultrastructure, biochemistry, pathology, virology, epidemiology, and ecology. They undertake research both within the school and around the world.

Infectious diseases currently under study by these methods include protozoa (malaria, leishmania, ameba, giardia), helminths (schistosomes, filaria, onchocerca), viruses (HIVs, hepatitis, leukemia retroviruses, and eastern equine encephalitis), and bacteria (Lyme disease agents, ehrlichia, and tuberculosis). Further immunologic studies focus on genetic regulation of the immune response; molecular mechanisms of the regulation of class II genes; the function and regulation of T-cell-derived cytokines; and cytokines involved in the regulation of inflammation.

The department offers two doctoral degree programs. The program leading to the Doctor of Science (SD) degree in immunology and infectious diseases is designed for candidates holding a clinical degree (MD, DVM, DMD, or equivalent) and interested in immunology and infectious diseases. The SD degree is also available to candidates without a clinical degree who wish to focus on the epidemiology of infectious diseases and who apply to the Interdisciplinary Program in Infectious Disease. The Doctor of Philosophy (PhD) program is designed for all other candidates, who enter through the Biological Sciences in Public Health program under the auspices of the Graduate School of Arts and Sciences. Please note that the application requirements for the SD and PhD programs are different, in that

the GRE subject test is required for the PhD program. The department no longer offers a Master of Science program.

Students in the various degree programs choose among the following areas of interest, as indicated:

Immunology The curriculum currently focuses on genetic regulation of the immune response, molecular mechanisms of the regulation of class II genes, and the function and regulation of T-cell-derived cytokines. Students take courses in cell biology, immunology, and molecular immunology.

Immunology and Molecular Biology of Parasitic and Other Infections This area of interest introduces students to recent advances in the biology of parasitic and infectious diseases and provides background for conducting research on these diseases. The program emphasizes molecular biology, immunology, cell biology, and the epidemiology of parasites.

Infectious Disease Epidemiology and Tropical Public Health This area of interest provides a solid understanding of epidemiology, ecology, and control of infectious diseases in developing countries. It emphasizes control and prevention measures, and the biological basis of diseases caused by pathogens that range from viruses to parasites.

Vector Biology, Ecology, and Control This area of interest focuses on the manner in which blood-feeding arthropods interact with their various vertebrate hosts and with the human pathogens that they transmit. These interests combine biological experimentation, epidemiological analysis, and population studies. Students become familiar with the various arthropods that are associated with human disease and learn the ways environmental change may result in ill health. Students conduct studies on mechanisms of transmission of vector-borne pathogens, both in the laboratory and in the field, and devise novel intervention strategies.

Interdisciplinary Program in Infectious Disease

Additional doctoral-level educational and training opportunities relating to infectious diseases are available through the Interdisciplinary Program in Infectious Disease. Students in this program fulfill the departmental requirement for doctoral students with additional coursework in biology, quantitative methods, and infectious disease. For more information on this program, see page 6.

Virology This area of interest is designed to prepare a future generation of experts for new developments in the pathogenesis and prevention of AIDS and other infectious diseases. At present the program emphasizes the epidemiology, biology, and vaccinology of AIDS as an example of a complex infectious disease, as well as hepatitis and retrovirus-induced leukemias and neurological diseases. Students take courses in virology, vaccine development, and related fields.

Doctor of Science in Immunology and Infectious Diseases

The Doctor of Science (SD) program is designed to prepare students for postdoctoral research fellowships, junior faculty positions at academic institutions, and positions in independent research institutions, in governmental agencies, and in the biotechnology industry. The program is designed for those interested in immunology, molecular biology, virology, and epidemiology of infectious diseases. Students choose a faculty advisor whose research interests match their own to begin researching their thesis topic.

This program aims to develop the basic skills in laboratory techniques and data handling necessary for undertaking original research. Course work during the first one or two years emphasizes cellular and molecular biology, virology, immunology, and genetics. Course work for students focusing on the epidemiology of infections also emphasizes epidemiology, biostatistics, and ecology.

Faculty

Department Chair: Myron E. (Max) Essex, DVM, PhD (University of California, Davis); John LaPorte Given Professor of Immunology and Infectious Disease and Chair of the Harvard AIDS Institute. Role of retroviruses as infectious agents in human leukemias and AIDS; mechanisms of immunosuppression by retroviruses; identification and characterization of retroviral proteins for seroepidemiological and diagnostic value and for vaccine development; hepatitis B virus and human liver cancer.

Barry R. Bloom, PhD (Rockefeller University); Professor of Immunology and Infectious Diseases (Immunology and Infectious Diseases and Population and International Health) and Dean of the Faculty of Public Health. Mechanisms of resistance and pathogenesis of diseases in developing countries, particularly tuberculosis and leprosy; genetic analysis of host resistance; development of genetically engineered vaccines against tuberculosis.

Barbara Burleigh, PhD (University of Western Ontario); Assistant Professor of Immunology and Infectious Diseases. Molecular and cellular basis of *Trypanosoma cruzi*-hostcell interactions; host cell invasion; signal transduction; *Trypanosoma cruzi* differentiation.

John R. David, MD (University of Chicago); Richard Pearson Strong Professor of Tropical Public Health. Immunology of migration inhibitory factor (MIF); the biologic role using MIF deficient mice; the biology of parasitism, focusing on leishmania; transfer of technology from the bench to field sites (Brazil) on problems of host resistance, risk factors, therapies, and control strategies.

Laurie H. Glimcher, MD (Harvard University); Irene Heinz Given Professor of Immunology; Professor of Medicine, Harvard Medical School. Genetic regulation of the immune response; the role of 1a (class II) major histocompatibility complex molecules and T-cell receptor proteins in T-lymphocyte activation; molecular mechanisms of regulation of the class II genes; function and regulation of the T-cell derived cytokine interleukin-4.

Michael J. Grusby, PhD (Northwestern University); Associate Professor of Molecular Immunology. Molecular and genetic analysis of cytotoxic T-lymphocyte-mediated lysis; generation of in vivo models of immune deficiency by homologous recombination in embryonic stem cells.

For more information about the SD program in Immunology and Infectious Diseases or other departmental inquiries, please contact the Assistant to the Chair, Department of Immunology and Infectious Diseases, 651 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0975
Fax: 617-739-8348
www: www.hsph.harvard.edu/Academics/iid/index.html

For application materials and information about admission to the PhD program, please contact the Graduate School of Arts and Sciences Admissions Office, Harvard University, 8 Garden Street, Cambridge, MA 02138.
Phone: 617-495-5315

Applicants who have specific questions about the PhD program may contact Ruth Kenworthy, Administrator, Division of Biological Sciences, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4470
Fax: 617-432-4098
E-mail: kenworthy@cvlab.harvard.edu

Donald A. Harn, Jr., AM (University of Northern Colorado), PhD (University of California, Los Angeles); Professor of Tropical Public Health. Regulation, or direction, of immune responses due to the molecular composition of particular antigens; development of synthetic peptide and DNA vaccines for parasitic diseases.

I-Cheng Ho, MD (Taipei Medical College), PhD (University of Michigan); Assistant Professor of Molecular Immunology. Molecular regulation and differentiation of GATA-3; expression of sPLA2 in the differentiation of T-cells.

Phyllis J. Kanki, DVM (University of Minnesota), SD (Harvard University); Associate Professor of Pathobiology. Pathobiology of human and simian retroviruses, including HTLV-1, STLV-1, SIV, HIV-1, and HIV-2; characterization of the immune response to various viral antigens and their correlation to stage of infection or disease.

Required courses for all concentrations include school-wide requirements in epidemiology (EPI 200 or EPI 201) and intermediate biostatistics (BIO 210 or BIO 211 or equivalent), as well as appropriate courses for one major (20 credits) and two minor fields (10 credits each). Electives are chosen according to a student's needs and interests. Courses may be taken at Harvard Medical School, the Graduate School of Arts and Sciences, and MIT, as well as at HSPH.

Students are encouraged to participate in the numerous seminar series and informal discussion groups offered on the Longwood campus. The department emphasizes publication of research results in the standard research literature, and most doctoral students publish several papers before completing the degree. Students must pass the school-wide oral qualifying examination, must adhere to the doctoral timetable for maintaining satisfactory progress, and must complete, defend, and submit a thesis based on intensive laboratory research under the guidance of a faculty advisor in the student's area of concentration.

Doctor of Philosophy in Biological Sciences in Public Health (BPH) (Immunology and Infectious Diseases)

Students wishing to study cellular and molecular biology, immunology, virology, or physiology as it pertains to major problems in public health should apply to the PhD Program in Biological Sciences in Public Health (BPH). This program offers the PhD degree through Harvard University's Graduate School of Arts and Sciences.

This PhD program is designed to train scientists in state-of-the-art concepts and methods in immunology, immune system disorders, virology, the biology of parasites, or important infectious diseases. The program offers a firm foundation in the basic biomedical sciences, as well as in epidemiology and biostatistics. Specific courses supplement this core, as dictated by individual research concentrations. Students in this program engage in laboratory rotations in three different research areas, to enable them to assess realistically their interest in a thesis project and to evaluate the suitability of the laboratory and the mentor. At the completion of these rotations, students select an area of concentration and a thesis research laboratory and complete the required curriculum. A qualifying examination must be passed before engaging in thesis work, and the thesis must be defended before the granting of the PhD.

Applicants generally have a bachelor's degree and demonstrated competence in organic and biological chemistry, general biology, physics, and calculus. Those deficient in one of these areas may be admitted provisionally on the condition that appropriate courses will be taken before and/or after entering the program. Applicants must take both the GRE general and subject tests by October in order to meet the application deadline of December 15, 1999.

All students admitted to the program receive a stipend, as well as tuition and health insurance support. Students are encouraged to apply for fellowships from outside sources since certain external fellowships provide higher stipends. While funds to support international students are limited, one special scholarship is available each year for a student from a developing, sub-Saharan African country. There is also a university-wide fellowship program that provides funding to qualified underrepresented minority students in the sciences.

Graduates ordinarily assume positions as faculty members and research scientists in graduate schools, medical schools, research institutes, or schools of public health. Career opportunities in the biological sciences as they apply to public health are expected to grow both in academia and in the biotechnology and pharmaceutical industries.

Courses Offered by the Department of Immunology and Infectious Diseases, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

IMI 201a. Ecology, Epidemiology, and Control of Important Parasitic Diseases of Developing Areas (J. Maguire)
Introduces ecological and epidemiologic concepts basic to the control of infectious agents. Considers parasitic diseases of significance in the developing areas of the world and elucidates epidemiologic principles of vector-associated diseases. (3 credits)

ID 201cd. Biology, Epidemiology, Economics, and Policy (BEEP): Malaria (A. Spielman)
Exposes students to vector control, diagnosis, chemotherapy, and vaccines for malaria from the point of view of social, political, and economic policy. Evaluates the impact of programs from an international and local perspective using techniques from social and biomedical sciences. (2.5 credits)

IMI 202c. Tuberculosis (W. Piessens, E. Nardell)
Covers the immunobiology, aerobiology, and molecular aspects of tuberculosis that underlie diagnostic and control strategies. Includes discussions of the impact of HIV/AIDS and of drug resistance on tuberculosis control and prevention. (2.5 credits)

IMI 204ab. Survey of Immunobiology (M. Grusby)
Examines the anatomy and physiology of the immune system, fate of antigen, cell trafficking, cellular interactions, regulation of the immune response, and B and T cell recognition mechanisms. Principles of immunoregulation are discussed in the context of current literature. (5 credits) Not offered 1999-2000.

IMI 205c. Clinical and Pathologic Features of Tropical Diseases (J. Maguire, F. von Lichtenberg)
Emphasizes the clinicopathologic aspects of tropical diseases. Disease entities are reviewed through clinical cases with exposition of the pertinent clinical and pathologic features. (1.25 credits)

IMI 206d. Principles of Public Health Entomology (A. Spielman)
Discusses from ecological, physiological, and genetic points of view the manner in which arthropods transmit disease. Outlines the principles of vector control. Includes weekend field trips. (2.5 credits)

IMI 208cd. Immunology of Infectious Diseases (D. Harn)
Presents the interactions of pathogens with the host immune system, from pathogen invasion to pathogenesis. (5 credits) Not offered 1999-2000.

Igor Kramnik, MD (Samara Medical Institute), PhD (Gabrichevsky Institute of Epidemiology, Immunology, and Microbiology); Assistant Professor of Immunology. Immunology and immunogenetics of infectious diseases; development and testing of diagnostic tools for predicting the susceptibility to tuberculosis in experimental models and human populations; vaccine development and testing.

Tun-Hou Lee, SM, SD (Harvard University); Professor of Virology. Humoral response to retroviral infections in humans; identification of coding sequences of human retroviruses and their gene products; evaluation of the relative immunogenicity of retroviral peptides for serodiagnosis and vaccine development.

Eric J. Rubin, MD, PhD, (Tufts University). Assistant Professor of Immunology and Infectious Diseases. Virulence factors of mycobacteria; acquisition of virulence determinants by *Vibrio cholerae;* generalized transposon mutagenesis systems for bacteria.

John C. Samuelson, MD, PhD (Harvard University); Associate Professor of Tropical Public Health. Use of molecular biological and biochemical techniques to study *Entamoeba histolytica*, the protozoan parasite that causes amebic dysentery.

Andrew Spielman, ScD (Johns Hopkins University); Professor of Tropical Public Health. Epidemiology of vector-borne disease; physiology and ecology of mosquitoes and ticks; development of infectivity of pathogens in mosquitoes and ticks.

Dyann F. Wirth, PhD (Massachusetts Institute of Technology); Professor of Tropical Public Health. Mechanisms of drug resistance in malaria, including molecular genetic analysis and field-based studies; genetic analysis of malaria transmission; analysis of gene expression; transsplicing and homologous recombination in *Leishmania enriettii* using molecular genetic techniques.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Donald A. Goldmann, MD (Harvard University); Professor in the Department of Immunology and Infectious Diseases. Epidemiology of nosocomial infections; epidemiologic approaches

to medical outcomes assessment and hospital quality improvement; role of microbiology laboratories in hospital epidemiology.

Martin S. Hirsch, MD (Johns Hopkins University); Professor in the Department of Immunology and Infectious Diseases. Pathogenesis and therapy of human retrovirus and herpes virus infections.

James H. Maguire, MD, MPH (Harvard University); Associate Professor in the Department of Immunology and Infectious Diseases. Clinical features and epidemiology of parasitic diseases.

Kenneth McIntosh, MD (Harvard University); Professor in the Department of Immunology and Infectious Diseases. Pathogenesis, prevention, and treatment of pediatric respiratory viral diseases; coronaviruses; new methods in viral diagnosis; epidemiology and pathogenesis of respiratory infections.

Adjunct Faculty

Kenneth H. Mayer, MD; Professor of Medicine and Community Health, Brown University School of Medicine.

Mary E. Russell, MD; Medical Director, Parexel International, Inc.

IMI 211d. Virology (P. Kanki, J. Sankale, M. Essex)
Presents principles of virus-host interactions at a population level. Selected viral pathogens are studied that exemplify the complexities of virus infection, host response, viral transmission, and disease. Emphasizes the public health perspective of various aspects of viral infections. Introduces laboratory techniques for surveillance and diagnosis of viral infections for epidemiological studies. (2.5 credits) Not offered 1999-2000.

IMI 216cd. Cellular and Molecular Biology of Parasites (J. Samuelson)
Covers aspects of cell, developmental, and molecular biology of protozoan and helminth parasites of humans. (5 credits)

IMI 222d. The AIDS Epidemic: Status, Dynamics, Prospects, Conflicts (P. Kanki, M. Essex)
Deals with a broad range of topics relating to the public health implications of the AIDS epidemic, including the virology, therapy, vaccines, and etiologic hypotheses concerning the origins of the virus. Topics include the dynamics of the epidemic, public policy issues, economic implications, and social support needs. (1.25 credits)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research or undertake specialized readings or studies.

Claudia Corra
Master's Student
Department of Maternal and Child Health

While working as a trading analyst, Claudia Corra decided to change her career path dramatically. She left the Federal Reserve Bank of New York's foreign exchange and government securities department, determined to apply her financial and economic skills to public health practice. Entering the Department of Maternal and Child Health, Corra began studying at-risk populations in order to develop, direct, and implement health care policies at the macro level.

"There are problems that affect groups such as the poor, the elderly, or children, that I wish to work on. My financial and policy background allows me the opportunity to use cost and benefit analysis skills towards the restructuring of health programs for at-risk populations," says Corra.

In the future, Corra would like to design and implement public health policies aimed toward providing affordable, fiscally responsible health services for those most in need.

The goal of the Department of Maternal and Child Health is to improve the health of women and children through basic and applied research, through preparation of professionals for leadership positions, and through advocacy and community service.

Faculty in the Department of Maternal and Child Health undertake research in six major areas: *infant mortality and morbidity,* including the evaluation of risk factors for mortality, methods for confidential perinatal inquiry, outcomes of high-risk infants, and the efficacy of early intervention; *normative growth and development,* including the analysis of patterns of growth, maturation, and behavioral, social, and nutritional changes in populations; *children with special needs,* including the assessment of health care for children with chronic illness or disability and the development of criteria for assessing proposals to reform the financing of health care; *high-risk youth,* including analysis of policies and strategies for preventing high-risk adolescent behaviors, examination of services for children and youth with HIV, and longitudinal studies of the risk factors for delinquency, violent behavior, substance abuse, mental illness, and learning disabilities; *nutrition,* including epidemiologic studies of child undernutrition in the United States and developing countries, exploration of computerized screening for women and children at nutritional risk, and inquiries concerning HIV and breast-feeding; and *women's and children's health services,* including studies of the planning, policy development, and performance of federal, state, and local public health agencies.

The department's academic curriculum includes courses on maternal and child health problems of public health significance; the physical, social, and cognitive stages of human development; women and health; maternal and child health services; the roles of governmental, private, and voluntary health agencies; research methods; and the methodology of program planning, policy formation, and program evaluation in maternal and child health. All concentrators in the department are expected to acquire an understanding of normative growth and development, definition and research in maternal and child health problems, maternal and child health services, legislation supporting health and social services for mothers and children, and the planning of such services. All

For more information about research and training in Maternal and Child Health, please contact Patricia Lavoie, Department of Maternal and Child Health, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1080
Fax: 617-432-3755
www: www.hsph.harvard.edu/Academics/mch/index.html

For more information about the Simmons College component of the two-degree program, please call 617-521-2141.

Faculty

Department Chair: Marie C. McCormick, MD, ScD (Johns Hopkins University); Sumner and Esther Feldberg Professor of Maternal and Child Health and Director of the Harvard Center for Children's Health; Professor of Pediatrics, Harvard Medical School. Infant mortality; outcomes of high-risk neonates and interventions to ameliorate adverse outcomes.

Iain W. Aitken, BM (Cambridge University), MPH (Harvard University); Lecturer on Maternal and Child Health (Maternal and Child Health and Population and International Health). Maternal health care; management of primary health care workers; design and financing of urban health care systems in developing countries.

Stephen L. Buka, SM, SM, SD (Harvard University); Associate Professor of Maternal and Child Health and Epidemiology. Causes and prevention of behavioral and developmental disorders of children.

Felton J. Earls, MD (Howard University); Professor of Human Behavior and Development; Professor of Child Psychiatry, Harvard Medical School. Longitudinal research to understand how community, family, and individual factors influence delinquent and criminal behavior.

Michael L. Ganz, MS, MPhil, PhD (Columbia University); Assistant Professor of Maternal and Child Health. The relationship between socioeconomic factors, behaviors, ecologic factors, and maternal and child health measures; applicability of health economics models and econometric methods to the analysis of maternal and child health data.

students fulfill the school-wide requirements for basic courses in biostatistics and epidemiology.

Limited tuition support may be available for some students in the department.

As described below, the department offers both four-semester and two-semester Master of Science (SM) programs, a dual master's degree program for nurses, and a doctoral program leading to the Doctor of Science (SD) or Doctor of Public Health (DPH) degree. Please refer to page 9 for information about the Master of Public Health concentration in Family and Community Health.

Master of Science in Maternal and Child Health (four-semester program)

The four-semester SM program is designed to prepare students for mid-level positions as project analysts, service coordinators, and managers in the field of maternal and child health. Recent graduates have taken such positions as deputy director of the National Coalition of Hispanic Human Services Organizations and training coordinator for the HIV Prevention Training Center.

Applicants to this program should have either a master's degree in a field not directly related to health (such as law, education, sociology, or statistics) or a bachelor's degree in a health-related field and at least two years of relevant work experience.

Of the 80 credits necessary to earn the four-semester SM, at least 30 must be earned in departmental courses or approved courses in other departments. Students in this program must also fulfill core requirements in biostatistics, epidemiology, environmental determinants of health, social and behavioral sciences, and health policy, planning, and administration. A minimum of 5 credits must be earned in field work either during the summer between the two years or in the second academic year.

Master of Science in Maternal and Child Health (two-semester program)

The two-semester SM program is designed to prepare health professionals for research careers in public and private agencies. Recent graduates have taken such positions as director of adolescent medicine at New England Medical Center, associate director of public health and research at Georgetown University, and assistant medical director of the Rhode Island Health Department; others have gone on to earn doctoral degrees.

Applicants eligible for the two-semester SM program are established practitioners or investigators holding prior master's or doctoral degrees in a related field such as medicine, dentistry, nursing, social work, nutrition, physical therapy, psychology, health education, or anthropology.

Of the 40 credits necessary to earn this degree, 20 must be earned in the Department of Maternal and Child Health or in approved courses from other departments.

Students in the two-semester SM program may choose to focus on a special area of interest, Quantitative and Evaluation Methods in Maternal and Child Health. This area of interest is designed to prepare health professionals for work in public and private agencies and places emphasis on quantitative methods, program evaluation, analysis of administrative data sets, and applied epidemiology. In addition to the regular two-semester SM requirements, this specialization includes an eight-week internship during the spring semester in an applied MCH setting, with placements typically at the Centers for Disease Control and Prevention or in state or local MCH agencies. The program also requires coursework on screening, needs assessment, and program evaluation. The standard duration is twelve months, with course work beginning during the summer prior to the academic year; however, an accelerated nine-month program is also available. Graduates of this program typically take positions as program evaluators/epidemiologists for MCH agencies.

Women, Gender, and Health

HSPH offers a number of courses relating to women, gender, and health. For more information, see page 7.

Four-semester, two-degree Master of Science in Maternal and Child Health (HSPH) and Parent-Child Nursing (Simmons College)

This four-semester, two-degree program is designed to prepare nurse practitioners for leadership roles in child, youth, women's, or school health programs. Recent graduates have taken such positions as director of clinical services for the Family Planning Association of Maine and staff director for the World Health Organization's Maternal Health and Safe Motherhood Program.

Applicants should hold a bachelor's degree from a program accredited by the National League for Nursing, a license to practice nursing, and the equivalent of at least three years of full-time nursing experience. International nurses with equivalent backgrounds are eligible to apply. Applicants must meet the general admission requirements of both HSPH and Simmons College.

Students enroll in half-time study at both Simmons College and HSPH for two academic years, in addition to studying at Simmons for one summer session. The curriculum of the HSPH portion of the program is the same as that for the two-semester SM program. Continued matriculation is dependent on maintaining satisfactory academic progress in both programs.

Doctor of Science in Maternal and Child Health/Doctor of Public Health

The doctoral programs are designed to prepare public health professionals for research careers in academic institutions, public and private health agencies, and leadership roles in national and international organizations. Recent graduates have taken such positions as scientist/study director at the National Academy of Sciences and faculty positions in universities.

Applicants must have an advanced degree in a health field related to maternal and child health. They are expected to have a sound academic record with documented proficiency in the quantitative sciences, relevant work experience, and research interest in an area consonant with the goals of the department.

Doctoral candidates must spend two years in residence completing course work leading to a major (20 credits) in maternal and child health and minors (10 credits each) in two other fields. Students must pass the departmental written examination and the schoolwide oral qualifying examination, must adhere to the doctoral timetable for maintaining satisfactory progress, and must complete, defend, and submit a thesis based on independent research.

Courses Offered by the Department of Maternal and Child Health, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

MCN 200b. Physical Growth and Development I (K. Peterson)
Introduces the principles of growth assessment that are an integral part of comprehensive child health programs. Topics include the selection, measurement, and interpretation of anthropometric indicators of growth. (2.5 credits)

MCH 201abcd. Public Health Practice in Maternal and Child Health (I. Aitken)
Provides students with opportunities to apply quantitative skills in a field situation. Students conduct needs assessments, present data for policy decisions, and gain experience in the organization and management of public health programs. (5 credits)

MCH 202c. Physical Growth and Development II: Seminar on Factors Affecting Growth and Development (J. Dwyer)
Explores the basic factors that influence physical growth and development from conception to maturity, and their implications at the individual, family, community, and national levels. (1.25 credits)

Jane Gardner, SM (Boston College), SM, SD (Harvard University); Senior Lecturer on Maternal and Child Health. Quality of health care for women and children; health outcomes research in publicly funded programs.

Karen E. Peterson, RD (Peter B. Brigham Hospital), SD (Harvard University); Associate Professor of Nutrition (Maternal and Child Health and Nutrition). Epidemiology of malnutrition in industrialized and developing countries.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Allen C. Crocker, MD (Harvard University); Associate Professor in the Department of Maternal and Child Health. Chronic illness and developmental disabilities in children; mechanisms of disability.

Barbara Gottlieb, MD (Tufts University), MPH (Boston University); Assistant Professor in the Department of Maternal and Child Health. Unintended pregnancy; cervical cancer; minority and community health; HIV risk and prevention; adolescent and school health; application of research methods in a community setting; methods of program evaluation.

Charles J. Homer, MD (University of Pennsylvania), MPH (University of North Carolina); Assistant Professor in the Department of Maternal and Child Health. Application of epidemiologic methods to the assessment of the effectiveness of health care services.

Daniel J. Kindlon, MS, PhD (Cornell University); Assistant Professor in the Department of Maternal and Child Health. Causes of behavior disorders and learning disabilities.

Ellice S. Lieberman, MD (University of Florida), MPH, DPH (Harvard University); Associate Professor in the Department of Maternal and Child Health. Perinatal epidemiology; risk factors for adverse pregnancy outcomes; assessment of new technologies and care practices in obstetrics.

Laura A. McCloskey, PhD (University of Michigan). Assistant Professor of Maternal and Child Health. Origins and sequelae of wife and child abuse; family origins of child psychopathology; women's mental health; victimization; posttraumatic stress.

Eli H. Newberger, MD (Yale University), SM (Harvard University); Lecturer in the Department of Maternal and Child Health. Child abuse and family violence.

Judith S. Palfrey, MD (Columbia University); Professor in the Department of Maternal and Child Health. Development of preschool children; interface of health and educational services for children.

Joan Y. Reede, MD (Mount Sinai School of Medicine), MPH, SM (Harvard University); Assistant Professor in the Department of Maternal and Child Health. Biomedical manpower and academic/research career development; provision of health services to and impact of health policy on disadvantaged, minority, and special populations.

Douglas K. Richardson, MD (Johns Hopkins University), MBA (University of Pennsylvania); Associate Professor in the Department of Maternal and Child Health. Impact of variations in practice styles on outcomes, resource use, and costs of neonatal intensive care.

Benjamin P. Sachs, MD, BS, MRCS, LRCP (University of London), DPH (University of Toronto); Professor in the Department of Maternal and Child Health. Epidemiology and health policy issues relating to women and children in technological evaluation, infant mortality, and medical services.

Edward C. Tronick, MS (Cornell University), PhD (University of Wisconsin); Associate Professor in the Department of Maternal and Child Health. Neurodevelopment of infants and children exposed to drugs in utero; depressive symptoms and mother-infant interaction.

Adjunct Faculty

Robin J. R. Blatt, Dip. Nursing, MPH; Genetics Coordinator/Public Health Nursing Advisor, Massachusetts Department of Public Health.

Johanna T. Dwyer, SM, SM, SD; Professor of Medicine and Community Health and Director, Stern Nutrition Center, Tufts Medical Center.

Marie P. Farrell, MS, MSN, EdD, MPH; Professor Walter Schroeder Endowed Chair in Nursing Research, University of Wisconsin.

William T. Garrison, MA, PhD; Professor of Pediatrics and Psychiatry, University of Massachusetts Medical School.

MCH 203cd. Analysis of Secondary Data (M. Ganz)
Introduces students to methods of access and analysis of relevant data sets commonly used by MCH researchers. Covers problems associated with using secondary data and the analytic methods needed to correctly test hypotheses with these data. Prepares students to perform and critique secondary data analyses. (2.5 credits)

MCH 204ab. Maternal and Child Health Programs and Policies
Discusses health care programs for mothers and children in the context of growth and maturational processes, legislative background, and social, mental health, and educational policies. (5 credits)

MCH 206a. Maternal and Child Health in Developing Countries (M. Farrell, I. Valadian)
Focuses on designing, implementing, and evaluating projects and programs for women and children in developing countries. Emphasizes developing skills in describing the health status of women and children and using these to design programmatic interventions. Considers rapidly changing social and cultural environments and the impact of conflict and changing economies on the health of women and children. (2.5 credits)

MCN 207ab. Nutrition in Child Growth and Development (J. Dwyer)
Examines principles and practical problems encountered in developing policies and programs involving nutritional issues, growth, and development. Discusses general principles of nutrition as background for policy issues. (2.5 credits)

MCH 208b. Adolescent Health (J. Kulig, B. Kennedy)
Examines adolescent health, risk behaviors, and prevention and intervention programs in relation to physical, psychosocial, and cognitive development. (2.5 credits)

MCH 209c. Services for Children with Disabilities (A. Crocker, D. Helm)
Looks at how service programs in the disability field are constructed, supported, and evaluated. Uses outside guests from community programs for many sessions. (2.5 credits)

MCS 210ab. Personality and Cognitive Development: Application to Public Health (D. Kindlon, F. Earls)
Examines the principles of child growth and development within a public health frame of reference. Emphasizes the theories and research of Bronfenbrenner, Skinner, and Erikson. (2.5 credits)

MCH 211cd. Women, Health, and Development (B. Gottlieb, N. Swenson)
Addresses the major issues concerning women and their relationship to health worldwide, including ways women affect the health of families, communities, and societies. (2.5 credits)

MCH 212ab. Developmental Disabilities I: Evaluation, Assessment, Families, and Systems (D. Helm, A. Crocker)
Focuses on issues facing professionals who work with people with developmental disabilities, including the professionals' role in diagnosing, evaluating, and assessing children who have developmental disabilities. (2.5 credits)

MCH 213d. Childbirth: Health Policy and Epidemiology (B. Sachs, D. Richardson, E. Lieberman)
Uses epidemiologic data to address perinatal health policy. Explores issues affecting childbirth services, including prenatal care, maternal health, and pregnancy complications. (1.25 credits)

MCH 214cd. Developmental Disabilities II: Values, Policy, and Change (D. Helm, A. Crocker)
Focuses on the community, system, and leadership components of developmental disabilities, with the goal of enhancing the quality of life of individuals with disabilities. (2.5 credits)

MCM 215cd. Methods of Planning and Evaluating Public Health Programs (S. Buka, M. McCormick)
Presents concepts and approaches to developing and evaluating programs and services for any health, human service, or social program. Topics include the development of knowledge and skills in needs assessment, program development, implementation and evaluation of public health programs. (2.5 credits) Not offered 1999-2000.

MCN 217c. Nutritional Surveillance (K. Peterson)
Covers theoretical and practical issues guiding the design and implementation of nutritional surveillance systems. (2.5 credits)

MCH 220b. Society and Its Effects on Child Health (J. Palfrey, R. Samuels)
Examines the ways that society affects children's health in the US. Covers the effects of poverty on health and the public policy impact on chronic illness. (2.5 credits)

MCH 222ab. Social Services for Children, Adolescents, and Families (E. Newberger)
Presents the role of social services in maintaining and promoting the health of children and their families. Examines current political trends structuring the content and delivery of social services. (2.5 credits)

MCE 223c. Child and Adolescent Mental Disorders: Public Health Perspectives (S. Buka, D. Kindlon, B. Mohler)
Examines the occurrence and risk factors of mental disorders of childhood and adolescence, including drug abuse and eating disorders. (1.25 credits)

David T. Helm, MA, PhD; Adjunct Associate Professor, Sociology Department, Boston University; Research Associate, Children's Hospital.

William E. Kiernan, MEd, MBA, PhD; Research Associate, Children's Hospital.

Lawrence C. Kleinman, MD, MPH; Assistant Clinical Professor of Pediatrics, University of California School of Medicine.

John W. Kulig, MD, MPH; Associate Professor, Tufts University School of Medicine.

Eugene Litvak, SM, PhD, Adjunct Lecturer.

Beat Mohler, MD, DrMed; Assistant Professor, Child Psychiatry, Public Health, University of Basel, Switzerland.

Albert J. Reiss, Jr., MA, PhD; William Graham Sumner Professor of Sociology, Emeritus, Yale University.

Deborah K. Walker, EdM, EdD; Assistant Commissioner, Bureau of Family and Community Health, Massachusetts Department of Public Health.

MCH 232a. Physical Growth and Development III: Advanced Seminar (I. Valadian)
A rigorous examination of the stages of physical growth and development introduced in MCN 200b. Expands on maturation, its components, their assessment, and underlying neurological, biological, and chemical changes. Discusses how the sequential unfolding of maturation promotes changes in health and nutrition services for individuals and populations of children. (2.5 credits)

MCH 233d. Public Health Genetics: Contemporary Issues and Challenges (R. Blatt)
Utilizes case studies to focus on developments in molecular biology and genetic medicine and to explore the impact on biomedical research, health care delivery, ecological systems, and public health policy and regulation. (1.25 credits)

MCH 297ab. Leadership in Minority Health Policy (J. Reede)
Focuses on strategies for career development in minority health policy and on leadership skills necessary for effective performance in areas of public health practice and public policy. (1.25 credits)

MCH 298cd. Issues in Minority Health Policy (J. Reede)
Explores public policy issues affecting the health status of minority and disadvantaged populations, emphasizing problem identification, policy analysis, and program planning. (2.5 credits)

Independent Study, Field Experience
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research, undertake specialized readings, perform field projects, or carry out independent studies. Formal tutorials are offered in the areas of clinical effectiveness and infant assessment in the context of prenatal exposures.

Rui Jiang
Doctoral Student
Department of Nutrition

While practicing internal medicine in China, Rui Jiang observed health problems that seemed related to diet. "I realized it would be more effective to prevent disease than to treat it, especially with chronic diseases," she says. "I started to become interested in the relationship between nutrition and human health."

Jiang studies both nutrition and epidemiology, a combination she believes will provide a strong foundation for research that can eventually benefit the global population, including China. "In many developing countries, fast food is gaining popularity, and with that comes increased consumption of fat and meat," says Jiang. "It is important to learn about the health consequences of this change in diet."

After graduation, Jiang would like to work at an academic or research institution in China or the US, "as long as I can continue researching the relationship between diet and disease risks."

The mission of the Department of Nutrition is to improve human health through enhanced nutrition. The department strives to accomplish this goal through research aimed at improved understanding of how diet influences health, the dissemination of new knowledge about nutrition to health professionals and the public, the development of strategies to enhance nutrition, and the education of researchers and practitioners.

The Department of Nutrition provides training and research opportunities in basic science relating to nutrition and in epidemiologic aspects of nutrition as they affect public health. Nutrition policy and the evaluation of nutritional interventions are long-standing interests of the department, particularly as they concern the populations of Latin America, Africa, Asia, and the United States. Interests of the department range from molecular biology to human studies of cancer and heart disease. Students learn and use the latest techniques in biochemistry, physiology, biostatistics, epidemiology, and related fields. Departmental research, whether basic or applied, is relevant to human health.

Current research covers a wide range of topics, including large prospective studies of dietary factors in relation to heart disease, cancer, diabetes, and ophthalmologic disease; development of methods to assess nutritional status by an analysis of body tissue; the interaction of nutritional factors with genetic determinants of disease; the interaction of nutritional factors and infectious agents; nutritional influence on blood pressure; effects of nutrition programs on the mental and physical consequences of malnutrition; nutritional determinants of blood lipid factors; lipoprotein metabolism; molecular mechanisms of diabetes and obesity; regulation of the intra- and inter-cellular delivery of macromolecular nutrients; and the molecular mechanism leading to atherosclerosis and thrombosis.

Some graduates have assumed positions as faculty members and research scientists at medical schools, research institutes, and schools of public health; others have gone on to careers as public health nutritionists in international organizations or federal, state, or local governments. Career opportunities in the biological sciences as they apply to public health are expected to grow both in academia and in the biotechnology and pharmaceutical industries.

As described below, the department offers two doctoral programs. The first is a program in nutritional epidemiology/international nutrition leading to the Doctor of Science (SD) or Doctor of Public

Health (DPH) degree. The second is a Doctor of Philosophy (PhD) program in nutritional biochemistry or cardiovascular biology, offered through the Biological Sciences in Public Health Program under the auspices of the Graduate School of Arts and Sciences. Applicants for the nutritional biochemistry or cardiovascular biology program who hold a clinical degree in medicine, veterinary medicine, or dentistry may prefer to follow a different curriculum leading to the Doctor of Science (SD) degree; this option may be available by special arrangement with the department.

Please refer to page 9 for information about the Master of Public Health concentration in Family and Community Health.

Doctor of Science in Nutrition/Doctor of Public Health

The program in Nutritional Epidemiology/International Nutrition leading to an SD or a DPH degree provides rigorous training in epidemiology and biostatistics as well as the biological aspects of nutrition. The overall objective is to enable students to investigate relationships between diet and disease.

The program includes formal course work, a practical research project, a seminar, and a thesis research project. Students must pass the departmental oral comprehensive examination and the school-wide oral qualifying examination, adhere to the doctoral timetable for maintaining satisfactory progress, and must complete, defend, and submit a thesis. In addition to fulfilling the school-wide doctoral requirements in introductory epidemiology (EPI 200 or EPI 201) and intermediate biostatistics (BIO 210 or BIO 211), students must complete a major (20 credits) in nutrition and two minors (10 credits each), one of which must be epidemiology. Students in a joint program with the Department of Epidemiology must satisfy the course requirements of both departments, select a minor field acceptable to both departments, and write a thesis on a topic concerning both nutrition and epidemiology.

Applicants must have a strong background in biology and mathematics. An MD or other professional health-related degree is desirable but not required. Admission to a joint program with Epidemiology requires the approval of both departments, and applicants should contact the Department of Nutrition before making formal application.

Funding may be available through the NIH-supported Training Program in Nutritional Science for students with previous doctoral degrees.

Interdisciplinary Program in Molecular Epidemiology

A doctoral program is available in this department through the Interdisciplinary Program in Molecular Epidemiology. Students in this program fulfill the departmental requirements for doctoral students with additional coursework in biology, genetics, exposure assessment, and epidemiology. For more information on this program, see page 6.

Doctor of Philosophy in Biological Sciences in Public Health (BPH) (Nutritional Biochemistry/Cardiovascular Biology)

Students wishing to study cellular and molecular biology or physiology as it pertains to major problems in public health should apply to the PhD program in Biological Sciences in Public Health (BPH). This program offers the PhD degree through Harvard University's Graduate School of Arts and Sciences.

The PhD program in nutritional biochemistry provides students with rigorous training in biochemistry, cell biology, and metabolism that allows them to work toward solving nutritional and metabolic problems in the laboratory. Students in cardiovascular biology learn to use cutting-edge technologies from molecular biology, biochemistry, and genetics to critically dissect the mechanisms underlying cardiovascular diseases such as heart attacks, strokes, heart failure, athero-

For more information about research and training in Nutritional Epidemiology/International Nutrition, please contact Kelly Wells, Department of Nutrition, 655 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1333
Fax: 617-432-2435
E-mail: nutrition@hsph.harvard.edu

For application materials and information about admission to the PhD program, please contact the Graduate School of Arts and Sciences Admissions Office, Harvard University, 8 Garden Street, Cambridge, MA 02138.
Phone: 617-495-5315

Applicants who have specific questions about the PhD program may contact Ruth Kenworthy, Administrator, Division of Biological Sciences, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-4470
Fax: 617-432-4098
E-mail: kenworthy@cvlab.harvard.edu

Faculty

Department Chair: Walter C. Willett, MD (University of Michigan), MPH, DPH (Harvard University); Fredrick John Stare Professor of Epidemiology and Nutrition; Professor of Medicine, Harvard Medical School. Relation of dietary factors to the occurrence of human disease, in particular heart disease and cancer.

Alberto Ascherio, MD (University of Milan), Diploma (London School of Hygiene and Tropical Medicine), MPH, DPH (Harvard University); Associate Professor of Nutrition and Epidemiology. Relation of dietary factors to the occurrence of human disease.

Hannia Campos, MS, PhD (Tufts University); Assistant Professor of Nutrition. Human lipoprotein metabolism; cross-cultural studies of diet and cardiovascular risk factors with emphasis on Hispanic populations; gene-environment interactions; biochemical markers of dietary intake.

Wafaie W. Fawzi, MB, BS (University of Khartoum), MPH, SM, DPH (Harvard University); Assistant Professor of International Nutrition and Epidemiology. Etiologies of infectious diseases with emphasis on dietary and nutri-

tional causes; relationships of dietary factors to disease in pregnancy and childhood.

Edward L. Giovannucci, MD (University of Pittsburgh), MPH, SD (Harvard University); Assistant Professor of Nutrition and Epidemiology. Etiologies of cancer with emphasis on dietary causes; methodologies to measure dietary factors in epidemiologic studies.

Gökhan S. Hotamisligil, MD (Ankara University), PhD (Harvard University); Associate Professor of Nutrition. Studies on the regulatory pathways that control energy metabolism; signal transduction in mammalian cells; biology of fatty acid binding proteins; genetic manipulation of mice.

David J. Hunter, MB, BS (University of Sydney), MPH, SD (Harvard University); Professor of Epidemiology and Director of the Harvard Center for Cancer Prevention. Cancer epidemiology; molecular epidemiology.

(Arthur) Mu En Lee, BM (Kaohsiung Medical College), PhD (University of California, San Francisco); Associate Professor of Molecular Biology. Transcriptional regulation of genes expressed in the blood vessel wall in normal and diseased states.

Jeffrey M. Leiden, PhD, MD (University of Chicago); Elkan R. Blout Professor of Biological Sciences. Transcriptional regulation of T-cell development and function; transcriptional regulation of cardiovascular development; somatic gene therapy for cardiovascular diseases.

Karen E. Peterson, RD (Peter B. Brigham Hospital), SD (Harvard University); Associate Professor of Nutrition (Maternal and Child Health and Nutrition). Epidemiology of malnutrition in industrialized and developing countries.

Guy L. Reed III, MS, MD (Stanford University); Associate Professor of Immunology. Analysis of platelet activation and cellular interactions by molecular cloning, biochemical, and histological techniques.

Eric B. Rimm, SD (Harvard University); Associate Professor of Epidemiology and Nutrition. Relation of dietary factors to the occurrence of human diseases, in particular cardiovascular disease.

Meir J. Stampfer, MD (New York University), MPH, DPH (Harvard University); Professor of Epidemiology and Nutrition. Influence of diet and exogenous hormones on health, particularly heart disease and cancer.

sclerosis, and congenital heart disease. Both programs also offer a firm foundation in epidemiology and biostatistics. Specific courses supplement this core, as dictated by individual research concentrations. Students in this program engage in laboratory rotations in three different research areas to enable them to assess realistically their interests in a thesis project and to evaluate the suitability of the laboratory and the mentor. At the completion of these rotations, students select an area of concentration and a thesis research laboratory and complete the required curriculum. A qualifying examination must be passed before engaging in thesis work, and the thesis must be defended before the granting of the PhD.

Applicants to the PhD program generally have a bachelor's degree and demonstrated competence in organic and biological chemistry, general biology, physics, and calculus. Those deficient in one of these areas may be admitted provisionally on the condition that appropriate courses will be taken before and/or after entering the program. Applicants must take both the GRE general test and at least one science-subject test by October in order to meet the application deadline of December 15.

All students admitted to the PhD program receive a stipend, as well as tuition and health insurance support. Students are encouraged to apply for fellowships from outside sources since certain external fellowships provide higher stipends. While funds to support international students are limited, one special scholarship is available each year for a student from a developing, sub-Saharan African country. There is also a university-wide fellowship program that provides funding to qualified underrepresented minority students in the sciences.

Courses Offered by the Department of Nutrition, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

NUT 201b. Principles of Nutrition (C. Lo)
Emphasizes basic concepts of nutrition from epidemiologic, clinical, metabolic, and international perspectives. Topics include nutritional assessment, malnutrition, obesity, eating disorders, and relationships between nutrition and cancer and heart disease. (2.5 credits)

NUT 202cd. The Science of Human Nutrition (F. Sacks, C. Lo)
Reviews the biochemistry of carbohydrates, fats, proteins, vitamins, and minerals in the context of human disease. Emphasizes current knowledge of the mechanisms that may explain the role of diet in the causation and/or prevention of ischemic heart disease, diabetes, obesity, hypertension, and cancer. (5 credits)

NUT 203ab. Nutrition Seminars I (W. Willett)
Covers current topics in nutrition. Usually taken by first-year students. (1.25 credits)

NUT 204cd. Advanced Topics in Nutrition I (G. Hotamisligil)
Enables students to review and analyze recent key papers that provide either epidemiological or laboratory evidence that bears on a topic of current interest in human nutrition. Teaches skills necessary for oral presentation. (2.5 credits)

NUT 205ab. Advanced Topics in Nutrition II (H. Campos)
Extends NUT 204cd by allowing students to participate in and present seminars reviewing current research and publications related to nutrition, and to attend advanced seminars presented by faculty and guest speakers. Provides practical training in communication skills for oral presentation. (2.5 credits)

NUT 206cd. Nutrition Seminars II (W. Willett)
Covers current topics in nutrition. Usually taken by second-year doctoral students. (1.25 credits)

NUE 207cd. Scientific Writing in Nutrition and Epidemiology (M. Stampfer)
Covers organization of scientific papers, presentation of data in graphical and tabular forms, and style. Designed for advanced students beginning to work on a paper for publication. (2.5 credits)

NUT 209ab. Seminars in Food Science and Technology (G. Herrera-Acena, C. Lo)
Examines the effects of genetic engineering, agriculture, food preservation and storage technology, marketing practices, and cooking on diet composition and public health. (2.5 credits)

NUT 210cd. Nutritional Problems of Less-Developed Countries (G. Herrera-Acena, W. Fawzi)
Discusses the nutrition problems of less-developed countries in the context of basic human needs. Reviews the ecological, biological, and behavioral consequences of malnutrition and emphasizes issues in human biology relevant to the formulation of nutrition policy and programs. (2.5 credits)

NUE 212b. Nutrition and Heart Disease (F. Sacks, M. Stampfer)
Covers the relationship between diets, nutrients, and cardiovascular disease from the perspectives of epidemiology, clinical trials, and metabolism. Topics include dietary fats, minerals, antioxidants, the folate/homocysteine system, alcohol, hypertension, and stroke. (1.25 credits)

NUT 214abcd. Research Techniques in Nutritional Biochemistry (M. Wessling-Resnick)
Enables students to rotate through the laboratories of faculty members in the Nutritional Biochemistry Program in order to learn current techniques applied to nutritional, cellular, and biochemical research. (10 credits)

NUE 216cd. Nutritional Epidemiology I (W. Willett)
Reviews methods for assessing the dietary intake of populations and individuals. Students gain experience in the collection, analysis, and interpretation of dietary intake data, and learn to integrate information from international studies, secular trends, clinical trials, analytical epidemiology, and animal experiments. (2.5 credits)

NUE 218ab. Nutritional Epidemiology II (A. Ascherio)
Addresses methodological aspects of research in nutritional epidemiology. Topics include validation studies, adjustment for energy intake, and correction of measurement error. (2.5 credits)

NUT 220d. Molecular Biology Laboratory Techniques (M. Wessling-Resnick)
Provides hands-on training in modern molecular research, including PCR, RFLP analysis, DNA sequencing, and interpretation of results. Emphasizes fundamentals of laboratory procedures. (2.5 credits)

NUT 301. Nutrition/Health Promotion in the Mass Media (W. Willett, L. Cheung)
Focuses on the role of the mass media in the promotion and adoption of healthy eating practices. Examines the import of the extent and quality of coverage in various mass media outlets, strategies for creating messages for mass media use, and the effectiveness of existing mass communication campaigns in nutrition. (Credit to be arranged)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in department research or to undertake specialized readings or studies in the following areas: nutritional epidemiology (A. Ascherio, W. Fawzi, E. Giovannucci, K. Peterson, E. Rimm, M. Stampfer, W. Willett); nutritional biochemistry (M. Berry, H. Campos, G. Hotamisligil, F. Sacks, M. Wessling-Resnick); clinical nutrition (C. Lo, W. Souba, W.A. Walker); cardiovascular disease biology (A. Lee, M. Perrella, G. Reed, J. Leiden); public health nutrition practice (L. Cheung).

Marianne Wessling-Resnick, MS (University of Chicago), PhD (University of Massachusetts); Associate Professor of Nutrition. Regulation of the cellular uptake of macromolecular nutrients; molecular basis of iron transport.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Marla J. Berry, PhD (University of California, Santa Barbara); Assistant Professor in the Department of Nutrition. Selenoprotein synthesis and translational control of gene expression.

Clifford W. Lo, MD (University of Hawaii), MPH (University of California, Los Angeles), ScD (Massachusetts Institute of Technology); Assistant Professor in the Department of Nutrition. Calcium, vitamin D, and parathyroid metabolism; total parenteral nutrition.

Mark Perrella, MD (University of Nebraska); Assistant Professor in the Department of Nutrition. Identification of factors important in regulating vascular tone during septic shock and the molecular mechanisms that regulate these factors.

Frank M. Sacks, MD (Columbia University); Associate Professor in the Department of Nutrition. Human lipoprotein metabolism; effects of diet and hormones; dietary fatty acids, cardiovascular disease, and cancer.

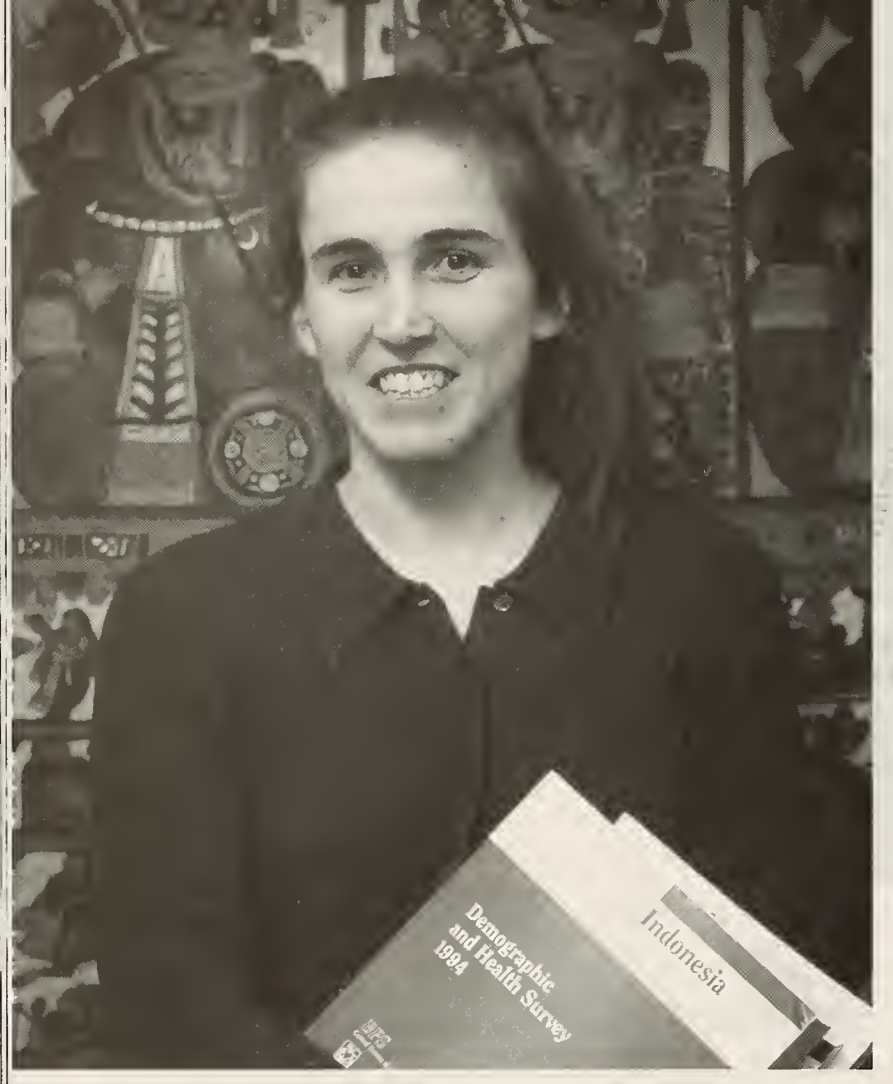
Wiley W. Souba, MD (University of Texas at Houston), SD (Harvard University); Professor in the Department of Nutrition. Nutrition, metabolism, and cancer; impact of glutamine nutrition on cellular function, metabolism, and structure.

W. Allan Walker, MD (Washington University); Professor in the Department of Nutrition. Gastrointestinal immunology; developmental gastroenterology; protective functions of breast milk; macromolecular transport; intestinal gene expression.

Adjunct Faculty

M. Guillermo Herra-Acena, MD (Harvard University; Physician, Department of Medicine, Brigham and Women's Hospital.

Victor Chengwei Shi, MD, MS; Senior Scientist, Novartis Pharmaceuticals, Inc.



Michelle Schulein
Master's Student
Department of Population and International Health

While doing volunteer work in Latin America and Indonesia, Michelle Schulein saw conflicts between health programs and local realities. "One program constructed flush latrines in an area where water was scarce," she says. "The houses didn't have running water, so the women would bring water back from a well for cooking, washing, and drinking. They weren't about to throw water down a toilet."

Schulein came to HSPH to acquire skills in qualitative and quantitative research, "specifically, to learn to assess health conditions in developing countries and make public health programs more effective." In particular, Schulein would like to explore issues related to women's reproductive health and, more generally, women's response to public health programs.

She recognizes that lessons learned in one country may not work in another: "A stove designed for Latin American women needs a flat surface for tortillas; women in Indonesia crouch while cooking and need a smaller stove. You need to bring all of the social and technical considerations together."

The goal of the Department of Population and International Health is to improve global health problems through education, research, and service. The 21st century is arriving with complex changes in demographic patterns, disease burdens, and health policies. These changes are affecting all of society, rich and poor, developed or developing. Effective diagnoses of public health problems and the development of effective policies to ameliorate those problems depends upon the expansion of basic and applied knowledge.

The department's faculty, students, and research fellows generate knowledge through interdisciplinary research, strengthen skills through educational programs, and enhance national capacities through collaborative projects, especially in developing countries. Department faculty apply their multidisciplinary expertise to population and international health issues by drawing on anthropology, demography, ecology, economics, epidemiology, ethics, medicine, political science, reproductive biology, and sociology. The department's research interests span a wide spectrum of topics, including social and economic development, health policy, and demography; design and financing of health care systems; women's health, reproductive health, and children's health; international patterns of aging; human rights; mental health; and prevention and control of infectious and chronic diseases, including AIDS, tuberculosis, cholera, and diarrheal diseases.

Students in the department come with various backgrounds. Some have had advanced training in the biological or social sciences or extensive experience in applied fields related to population sciences. Others begin with bachelor's-level training. Many students are from developing countries. All have an interest in the health of disadvantaged populations worldwide.

As described below, the department offers both a four-semester Master of Science (SM) program and a program leading to the Doctor of Science (SD) or Doctor of Public Health (DPH) degree. In addition to these programs, the department hosts research fellows and mid-career leaders in population and health research and undertakes cooperative technical projects overseas. Please see page 9 for information about the Master of Public Health concentration in International Health.

Master of Science in Population and International Health

The SM program, which is completed in four semesters, equips students with the skills and knowledge required by professional organizations active in the fields of population and international health. Recent graduates have taken such positions as consultant on family planning and service delivery in women's health for United Nations organizations, and consultant to the Population Council. Others proceed from the SM to the doctoral program.

Applicants must have a bachelor's degree or equivalent, though many students hold advanced degrees in medicine or a social science discipline. Preference is given to those with relevant work experience in international health.

Of the 80 credits necessary to complete the master's program, about half are earned in required courses. Some of these are departmental requirements, including a 5-credit master's thesis, while others represent school-wide requirements in biostatistics and epidemiology. The remaining credits allow students to specialize in particular areas of interest under the guidance of faculty advisors.

The first year of study is usually devoted to full-time course work. During the summer between the first and second years, students are encouraged to undertake internships providing practical experience in population and international health. The second year usually involves a combination of course work and completion of the master's thesis.

Doctor of Science in Population and International Health/Doctor of Public Health

The doctoral programs are designed to prepare students for both professional leadership positions in the public or private sectors of public health and for academic careers in universities or research institutions. Recent graduates have taken positions with the Centers for Disease Control and Prevention, the World Bank, non-governmental organizations, and postdoctoral and teaching positions with universities in the US and around the world.

Desired applicants have outstanding academic records, substantial relevant experience in the international public health arena, and professional interests that match one of the department's three doctoral concentrations: population and reproductive health, international health policy and economics, and international health epidemiology and human ecology. A master's degree is recommended, but not required, for entry into a doctoral program. Students may enter the department's 80-credit master's degree program and, at a later date, apply to enter the doctoral program. Entry to the doctoral program will then depend upon outstanding performance in the master's degree program and acceptance through the regular doctoral program admission process.

Two academic years of full-time residence at the graduate level are required. The first year is ordinarily devoted to course work. The second year usually involves both course work and research planning. Subsequently, additional courses are taken to fulfill remaining requirements and/or to gain special skills related to thesis research. The pace of progress depends largely on the student's individual plan, which is designed in collaboration with an advisor and thesis committee. Ultimately, students must demonstrate detailed knowledge and understanding of a major field (20 credits) and two minor fields (10 credits each), must pass both the departmental written examination and the school-

Interdisciplinary Program in Infectious Disease

Additional doctoral-level educational and training opportunities relating to infectious diseases are available through the Interdisciplinary Program in Infectious Disease. Students in this program fulfill the departmental requirement for doctoral students with additional coursework in biology, quantitative methods, and infectious disease. For more information on this program, see page 6.

For more information about research and training in Population and International Health, please contact the Education Office, Department of Population and International Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2253
Fax: 617-566-0365

Faculty

Department Chair: Michael R. Reich, AM, PhD (Yale University); Taro Takemi Professor of International Health Policy. Political economy of health and development; health consequences of development policy; health policy in Japan.

Iain W. Aitken, BM (Cambridge University), MPH (Harvard University); Lecturer on Maternal and Child Health (Maternal and Child Health and Population and International Health). Maternal health care; management of primary health care workers; design and financing of urban health care systems in developing countries.

Peter A. Berman, MSc, PhD (Cornell University); Associate Professor of International Health Economics. Health care financing in developing countries; economic assessment of health policies and programs.

Barry R. Bloom, PhD (Rockefeller University); Professor of Immunology and Infectious Diseases (Immunology and Infectious Diseases and Population and International Health) and Dean of the Faculty of Public Health. Mechanisms of resistance and pathogenesis of diseases in developing countries, particularly tuberculosis and leprosy; genetic analysis of host resistance; development of genetically engineered vaccines against tuberculosis.

David E. Bloom, MA, PhD (Princeton University); Professor of Economics and Demography; Deputy Director, Harvard Institute for International Development. Applied micro-economics: labor, population, health, development, and environment; demography.

Paul H. Campbell, MPA (Portland State University), SD (Harvard University); Lecturer on Management. Financial management, strategic planning, and reimbursement systems; health services in developing countries.

For more information about the Takemi Program in International Health, contact Michael R. Reich, PhD, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0686
Fax: 617-432-1251
E-mail: takemi@hsph.harvard.edu

Richard A. Cash, MD (New York University), MPH (Johns Hopkins University); Lecturer on International Health; Institute Fellow, Harvard Institute for International Development. Development of health systems for rural and urban populations in developing countries.

Arthur J. Dyck, AM (University of Kansas), PhD (Harvard University); Mary B. Saltonstall Professor of Population Ethics; Member of the Faculty, Harvard Divinity School. Concepts of human rights, including ethical issues.

Sophia M. Gruskin, JD (Benjamin N. Cardozo School of Law), SD (Harvard University); Lecturer on Health and Human Rights. Health and human rights; gender, reproductive, and sexual health; global implications for the rights of the child to health; links between HIV/AIDS, health, and human rights.

Joseph J. Harrington, AM, PhD (Harvard University); Professor of Environmental Health Engineering (Environmental Health and Population and International Health); Gordon McKay Professor of Environmental Engineering, Faculty of Arts and Sciences. Water resources planning and quality management; environmental monitoring and control systems; applied statistics for modeling; management for tropical disease control.

Allan G. Hill, PhD (University College, Durham), Diploma in Demography (Princeton University); Andelot Professor of Demography. Demography of the Middle East and West Africa; impact on mortality of child survival programs; modern contraception and reproductive health.

Sheila Sen Jasanoff, MA (University of Bonn); PhD, JD (Harvard University); Professor of Science and Public Policy, John F. Kennedy School of Government. Comparative study of biotechnology in Britain, Germany, and the US.

The Takemi Program in International Health

This is a nondegree program offering fellowships for research and advanced training on critical issues of international health, especially those related to developing countries. The program is interdisciplinary in nature and addresses problems of mobilizing, allocating, and managing scarce resources to improve health, and of designing strategies for disease control and health promotion. Fellows' research is usually related to a policy problem in their own country.

Takemi fellows are professionals and scholars from around the world with training and experience in public health, medicine, economics, policy analysis, biological science, and other fields. The program enables individuals in the early or middle stages of their careers to strengthen their knowledge and skills in health, economics, epidemiology, political analysis, or other analytic methods. It is not designed for projects with biomedical laboratory requirements.

The program can fund a limited number of fellowships each year and can assist in identifying external sources of funding, which applicants are encouraged to pursue.

wide oral qualifying examination, must adhere to the doctoral timetable for maintaining satisfactory progress, and must prepare, defend, and submit a thesis based on original research.

The major field must be chosen from one of the three areas of concentration offered by the department, as described below. Minor fields may also be chosen from the department or from allied departments of the school or university, including the Departments of Biostatistics, Epidemiology, Health and Social Behavior, Immunology and Infectious Diseases, Nutrition, or Maternal and Child Health. The departmental concentrations promote skill development, encourage multidisciplinary approaches to health problems, and provide opportunities for extensive linkages in diverse field settings in Africa, Asia, or Latin America.

Population and Reproductive Health This concentration is designed for students with an interest in the interdisciplinary study of human fertility, health, and mortality, and who desire a population-based perspective on the changing patterns of mortality and morbidity worldwide. A core curriculum provides students with the basic skills to measure demographic and health trends, and to understand how fertility, mortality, age structure, and reproductive health are inextricably linked. Students become familiar with the global and regional components of reproductive health, and its determinants and consequences. International and local policies as well as services for promoting family planning, reproductive health, and family health are examined and their impact evaluated.

The program stresses a population-based approach to international health issues. Comparative analysis is used to highlight disparities, similarities, and differences between developed and developing countries' experiences, and between different social classes within a single population. There is a strong emphasis on field methods and practical aspects of data collection, analysis, and presentation. Though faculty are drawn from a variety of disciplinary backgrounds, all have close contact with contemporary population and reproductive health problems in developing countries.

Faculty research in this concentration includes the design and use of qualitative and quantitative methods for the study of reproductive mortality and morbidity; infertility and its determinants and consequences; the fertility transition in poor countries; the design and evaluation of family planning and reproductive health services; gender-based perspective and differentials in fertility, health, and mortality; intergenerational relations in developing countries; and policy reform following the 1994 Conference on Population and Development.

This concentration has strong regional interests in South and East Asia, sub-Saharan Africa, North Africa, and the Arab world.

International Health Policy and Economics This concentration is designed for students who wish to develop skills and pursue research on the economic and political analysis of health policy in developing and less-developed countries. The concentration has three main objectives: First, to provide students with doctoral-level knowledge in theory, analysis, and research methods in either political science or economics so that they are able to perform doctoral research in this area. Second, the concentration provides students with a broad education in population sciences, epidemiology, and issues and institutions in international health. Third, a component on the political economy of international health complements the training in economics.

Students in this concentration choose to focus on either economics or political science. Candidates who focus on economics are required to take microeconomic theory, econometrics, and other field economics such as welfare and development economics equivalent to the level offered by a doctoral program in a standard economics department. Candidates less well-prepared in quantitative methods usually take a year longer to complete the course work required for the program. Applicants are encouraged to contact faculty in the concentration to discuss necessary levels of quantitative skills required for entry.

International Health Epidemiology and Ecology This concentration is designed for students who wish to take a broad, integrated approach to researching health problems and in developing the methods for such study. Students acquire an understanding of health as part of the relationships between people and between humans and nature in the contexts of evolution, environmental change, infectious disease ecology, economic development, and demography. Through this process, students gain skills to identify the determinants, consequences, and dynamics of health problems and learn to plan, implement, and evaluate health promotion and disease prevention strategies and programs.

Bio- and Public Health Mathematics

Several departments offer courses designed to promote research and education in mathematics as applied to scientific problems in public health and medicine. The Committee on Bio- and Public Health Mathematics has compiled a list of courses that teach the development or implementation of mathematical tools in public health research.

The epidemiologic component of this area emphasizes the application of the combination of ecological, population-genetic, and evolutionary theories with qualitative mathematical methods on international patterns of health and disease. The ecological aspect of the curriculum focuses on health aspects of ecology and the inseparability of social and biological aspects of human ecology. Students also acquire in-depth knowledge of a sampling of major disease problems, ecological habitats, and health programs.

Courses Offered by the Department of Population and International Health, 1999-2000

Please note that this list may be incomplete and is subject to change. Detailed course listings, including information about prerequisites, course activities, and scheduling, are distributed to students with registration information.

Letters following course numbers indicate the period(s) in which a course is given: a and b (fall quarters); c and d (spring quarters); e and f (one-week sessions in January and March); s and t (1999 summer sessions).

PIH 200a. Population and Health (M. Rahman)
Teaches the population-based approach to give insight into international public health issues. Reviews the links between fertility, mortality, and reproductive health. Examines health and mortality transitions in developed and developing countries. (2.5 credits)

PIH 202b. Population, Health, and Development (A. Hill, D. Bloom)
Examines the relationships between population change and development in history and in the contemporary world. Introduces classics in the population and economic development literature. Reviews the causes and consequences of the demographic transition in developing countries and assesses the

For more information about courses related to Bio- and Public Health Mathematics, contact Tamara Awerbuch, PhD, Department of Population and International Health, 665 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2505
Fax: 617-566-0365
E-mail: tamara@hsph.harvard.edu

Saidi H. Kapiga, MD (University of Dar es Salaam), MPH, SD (Harvard University); Assistant Professor of International Health. Development and assessment of community-based HIV/STD control programs; development and testing of interventions to reduce perinatal transmission of HIV; determinants of fertility, family planning services provision, and cervical cancer.

Ulla M. Larsen, MA (Odense University, Denmark), PhD (Princeton University); Associate Professor of Demography. Interface of demography and health; sterility and reproductive health; focus on Africa.

Richard Levins, PhD (Columbia University); John Rock Professor of Population Sciences. Human ecology; viability of populations and environments; special interest in Caribbean region.

Stephen P. Marks, Diplôme, PhD (University of Paris); François-Xavier Bagnoud Professor of Health and Human Rights and Director of the François-Xavier Bagnoud Center for Health and Human Rights. Human rights and international affairs.

Christopher J. L. Murray, MD (Harvard University), DPhil (Oxford University); Professor of International Health Economics. Tuberculosis control strategies, with an emphasis on cost-effectiveness; health transition studies.

Carla M. Obermeyer, MA, MSc (American University of Beirut), SD (Harvard University); Associate Professor of Population and Anthropology. Cultural context of health and reproduction; reproductive health care in North Africa; demography of Arab countries; population policies in the Middle East; cultural construction and management of menopause in Morocco and Lebanon.

M. Omar Rahman, MD (Northwestern University), MPH, SD (Harvard University); Associate Professor of Demography and Epidemiology. Healthy aging in rural societies; determinants of pregnancy outcomes in developing countries; assessment of adult health status and international comparisons of gender differences; assessment of quality of health care services; socioeconomic determinants of adult health. (On leave until July, 2000)

Chi-Man (Winnie) Yip, PhD (Massachusetts Institute of Technology); Assistant Professor of International Health Policy and Economics. Application of economic models and econometric techniques to study of health care policies.

The following faculty members have secondary appointments at HSPH. Their primary affiliation is with Harvard Medical School.

Mary Carlson, MA (University of Wisconsin), PhD (Northwestern University), MPA (Harvard University); Associate Professor in the Department of Population and International Health. Recovery of behavioral function after brain damage or sensory deprivation; consequences of social deprivation in institutionalized infants; street children and child rights legislation in Brazil.

relationships between gender differences and other inequalities to past and current demographic patterns. (2.5 credits)

PIH 203cd. Computer Methods for Demography and International Health (S. Atwood, U. Larsen)
Covers computer techniques required for the design, collection, management, and analysis of types of data commonly encountered in population and health surveys in developing countries. Provides students with the computer skills needed in PIH 220b. (2.5 credits)

PIH 211b. Financial Control in Health Organizations (P. Campbell)
Introduces topics critical in managing health organizations and programs in developing countries. Focuses on the financial element of management, from the language and concepts of accounting to analytical methods. (2.5 credits)

PIH 212c. Sociocultural Dimensions of International Health (H. Heggenhougen)
Reviews the relevance of sociocultural factors and elaborates the contributions of medical anthropology to international public health. Topics include health-seeking behavior, professional and public health education, and anthropological approaches to tropical diseases. (2.5 credits)

PIH 216d. Child Rights/Child Health (S. Gruskin)
Focuses on international human rights norms, institutions, and procedures and their application to selected topics in child health, including disability, refugee status, and HIV/AIDS infection. (1.25 credits)

PIH 217d. How Vulnerable Are We to HIV? (S. Gruskin)
Provides a method for assessing individual and collective vulnerability to the HIV/AIDS epidemic. Considers the sensitivity, specificity, and applicability of assessment methods at different stages of the pandemic. (2.5 credits)

PIH 218c. Health and Human Rights (S. Gruskin)
Topics include the impact of health policies and programs on human rights, health consequences of human rights violations, and the linkage between promoting and protecting health and promoting and protecting human rights. (2.5 credits)

PIH 220b. Introduction to Demographic Methods (U. Larsen)
Presents the main demographic approaches to the study of population structure and dynamics, including data sources, age and sex composition, population growth, fertility, nuptiality, and mortality. (2.5 credits)

PIH 221c. Fertility Analysis (U. Larsen)
Introduces techniques in fertility analysis and the various data sources used to estimate and interpret levels and differentials of fertility. Emphasizes underlying assumptions, application of methods, and interpretation of results. (2.5 credits)

PIH 222d. Mortality Analysis (A. Hill)
Provides a thorough grounding in methods and materials used to measure mortality trends and differentials in developing countries. Describes models and assumptions underlying the estimation of methods. Presents methods for checking and adjustment of the basic data and calculation of life tables from vital statistics, birth histories, routinely collected data, and information from health facilities. (2.5 credits)

PIH 224d. The Epidemiology of the Family (M. Rahman)
Explores how membership in a family affects one's health and survival, including investigations of the social, economic, behavioral, informational, and biological links between individuals and their kin group. (2.5 credits)

PIH 225c. Qualitative Research Methods for Population and Health (C. Obermeyer)
Introduces anthropological methods used to gain insight into shared understandings and behaviors. Emphasizes the distinctions between the collection and interpretation of data obtained by observation, by interviewing and focus groups, and by the analysis of texts and narratives. (2.5 credits)

PIH 227b. Culture, Health, and Reproduction (C. Obermeyer)
Uses the concepts of anthropology to understand health and reproduction in their sociocultural context. Topics include reproduction and menstruation, cultural notions of reproductive health and family planning, gender inequality, breast feeding and child nutrition (2.5 credits)

PIM 233b. Biological and Clinical Foundations of Reproductive Health (I. Aitken)
Introduces the anatomy and physiology of human reproduction and covers the essential clinical features of common complications of pregnancy, childbirth, and reproductive tract infections. (2.5 credits)

PIM 234c. Maternal and Perinatal Health Care in Developing Countries (I. Aitken)
Covers the biology and epidemiology of maternal and perinatal health problems in developing countries. Teaches students to evaluate the absolute and relative importance of causes of obstetric morbidity and mortality and of low birthweight, and to evaluate the effectiveness of prevention strategies. (2.5 credits)

PIM 238d. Infectious Reproductive Morbidity and Infertility (I. Aitken)
Provides an overview of the global epidemiologic patterns, causal mechanisms, and biologic consequences of reproductive tract infections, including an evaluation of diagnostic methods. (2.5 credits)

PIP 240d. Political Economy of International Health Policy (M. Reich)
Examines issues of health and development in the context of international politics and economics. Explores ways in which relations between developed and developing countries affect the formulation and implementation of health policy. (2.5 credits)

PIH 241c. Health Planning in Developing Countries: Cost-Effective Analysis and Priority-Setting Techniques (C. Murray)
Teaches applied skills needed for the economic evaluation of health projects, interventions, and programs. Emphasizes cost effectiveness and its use in sectoral resource allocation decisions, including ethical underpinnings. (2.5 credits)

PIH 244b. Health Sector Reform: A Worldwide Perspective (P. Berman)
Surveys the impact of the global movement to reform national health care systems on lower to middle income countries. Introduces a framework for analyzing health care systems and designing strategies for system reform, and examines some of the major elements of reform strategies with specific references to these developing countries. (2.5 credits)

PIH 245ab. Population and Development Policies: A World of Contention (G. Zeidenstein)
Covers the development and implementation of population policies within the broader context of international development activities. Topics include the United Nations, ethical considerations, environment, security, gender and sexuality, reproductive health and family planning programs, shifting US positions, resources, and implementation. (2.5 credits)

PIH 246cd, 247cd. Doctoral Seminar in International Health Policy and Economics (M. Reich, P. Berman, C. Murray, C. Yip, W. Hsiao)
Explores important international health policy and economics research topics. Emphasizes theoretical frameworks, analytical techniques, empirical applications, and technical results. (1.25 credits each semester)

PIH 248d. Data and Economic Analysis for Health Policy Formulation in Developing Countries (M. Chawla, P. Berman)
Uses real datasets from developing countries to train students in using some of the main tools and analysis techniques derived from economics to analyze conditions and design policy options for health sector reform. (2.5 credits)

PII 250b. Epidemiology of Infectious Diseases of Public Health Importance in Developing Countries (R. Cash)
Reviews the epidemiology of infectious diseases of public health importance in developing countries. Emphasizes epidemiologic patterns of bacterial and viral diseases as they relate to different geographic and socioeconomic environments. (3 credits)

PIH 251d. Evaluating the Impact of Health Interventions in Developing Countries (A. Hill)
Introduces methods used for measurement of the demographic impact of health interventions. Focuses on the production in groups of evaluation strategies for health intervention projects, including diarrheal disease control, limiting AIDS infection, reduction of malaria morbidity and mortality, primary health care, family planning and reproductive health. (2.5 credits)

PIH 253b. Human Ecology (R. Levins)
Provides a broad overview of the human ecosystem as it emerges out of, but differs from, prehuman ecology. Topics are selected from biosphere processes, population interaction, agricultural systems, adaptation evolution and ecology of disease, ecological politics, and evolution. (2.5 credits)

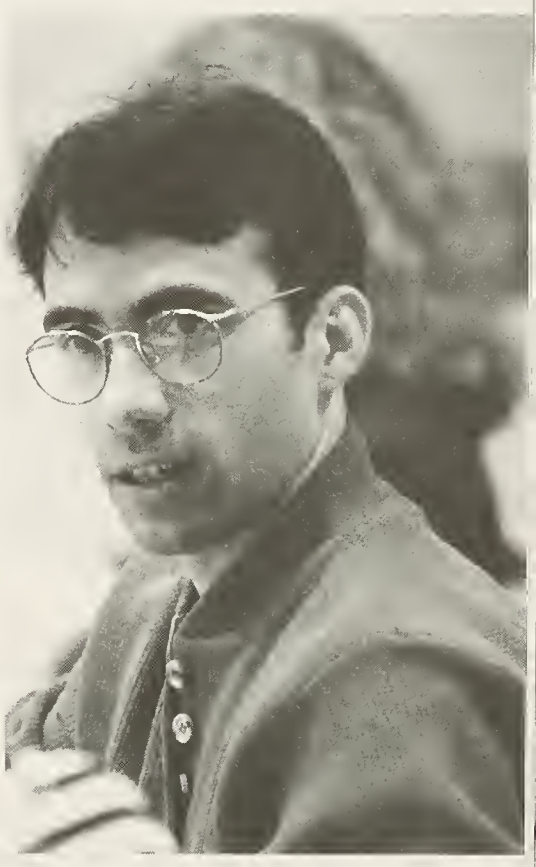
PIH 257d. New and Resurgent Disease (R. Levins, T. Awerbuch)
Covers new and resurgent disease as a general problem of evolutionary ecology and social change. Topics include disease and changes in the environment or population. (1.25 credits)

PIH 258b. The Frontiers of Knowledge in HIV/AIDS Prevention, Care, and Research (M. Reich)
Provides an update on the current state of knowledge about HIV/AIDS epidemiology, prevention, care, and research. Covers the scientific, technical, programmatic, and policy aspects of the response to HIV/AIDS in the US and elsewhere. (2.5 credits)

PIH 261cd. Mathematical Models in Biology and Public Health (R. Levins, T. Awerbuch)
Examines mathematical models as a basis for analyzing biological and social phenomena relevant to public health. Topics include the spread and maintenance of infectious diseases, and diffusion bioassays for determining toxicity and mutagenicity of drugs. (2.5 credits)

PIH 263e. Grant Writing for Funding of Research and Health Care Projects (K. Dumbaugh, R. Cash)
Provides participants with the opportunity to prepare a grant proposal for submission to a funding agency, a framework for writing proposals for research or other projects, and information about organizations that fund such work. (1 credit)

Independent Study
Individual students or small groups of students who wish to go beyond the content of regularly scheduled courses may arrange with individual faculty members to participate in departmental research, undertake specialized readings, or carry out independent studies.



Mary E. Wilson, MD (University of Wisconsin); Assistant Professor in the Department of Population and International Health. Infections acquired during travel and residence in tropical and developing countries.

Grace Wyshak, SM (Harvard University), PhD (Yale University); Associate Professor in the Departments of Biostatistics and Population and International Health. Biostatistical and demographic methods; women's reproductive health.

Adjunct Faculty

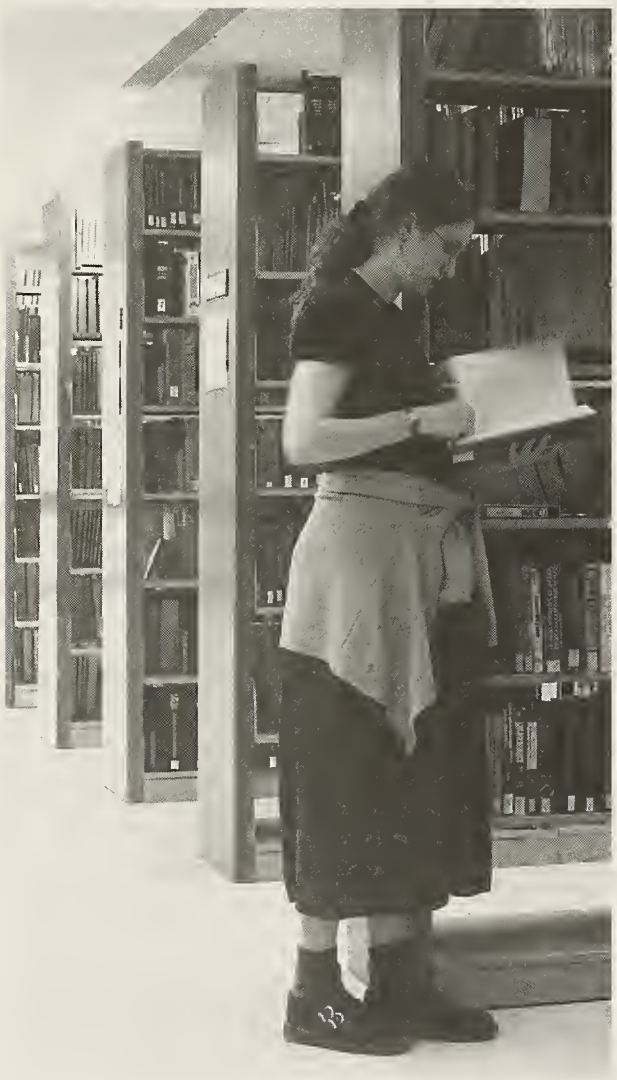
Sudhir Anand, DPhil; Acting Director of the Harvard Center for Population and Development Studies; University Lecturer in Quantitative Economic Analysis, Oxford University.

John C. Caldwell, PhD; Professor and Chairman, Department of Demography, Australian National University.

Adetokunbo O. Lucas, MD, SM; consultant.

Amartya K. Sen, MA, PhD; Master of Trinity College, Cambridge University.

Gita Sen, MA, PhD; Professor, Indian Institute of Management, Bangalore, India.



Summer Session for Public Health Studies

Session *s*: July 1-23, 1999
Session *t*: July 26-August 13, 1999

Director: Roberta Gianfortoni, MA, Director for Professional Education, Office for Professional Education

The Harvard Summer Session for Public Health Studies introduces students to the core areas of public health in two intensive sessions. Courses in the program help students develop the ability to define, assess, and evaluate the health needs of populations, to participate in the development of health policy, and to assure the delivery of health services.

Students in the Summer Session attend one or two sessions in July and August. The 1999 curriculum includes courses in biostatistics, epidemiology, health care management, health policy, ethics, environmental health, and social and behavioral science. Each course offers 2.5 credits, and the maximum recommended course load is 5 credits (two courses) per session. Because the course work is very intensive and fast-paced, students registered for two courses in a session should not have other work commitments.

The Summer Session is intended for health professionals in training or those who are considering a midcareer change into public health and feel the need to develop their skills. Participants include public health professionals, primary care practitioners, physicians engaged in the evaluation of health care delivery and management, physicians in training (including preventive medicine residents and medical students in an MD/MPH joint degree program), and candidates for a part-time MPH program. Students accepted for admission to an HSPH degree program may choose to begin their studies early by enrolling in the Summer Session; these students will then have greater flexibility in course selection during the academic year. Other students may subsequently seek admission to an HSPH degree program. Students eligible for the MPH in Quantitative Methods or Clinical Effectiveness concentrations may apply for a summer MPH to be completed in three consecutive summers. Please see page 10 for more information.

Tuition for the 1999 Summer Session is $574 per credit.

Summer Program in Clinical Effectiveness

July 1-August 14, 1999

Co-directors: E. Francis Cook, SD, Professor of Epidemiology; Arnold M. Epstein, MD, John H. Foster Professor of Health Policy and Management; and Anthony Komaroff, MD, Professor of Medicine, Harvard Medical School

The Program in Clinical Effectiveness is affiliated with Brigham and Women's Hospital, Massachusetts General Hospital, and Harvard Medical School, and is intended for physicians who have completed their residencies and wish to obtain the quantitative and analytical skills needed for careers in clinical research. Candidates must be fellows or faculty members, and are usually sponsored by their clinical departments or divisions.

Students in this program attend an intensive seven-week, 15-credit summer program, comprising courses in biostatistics, epidemiology, and health policy and management. Upon completion of the summer program, qualified participants who apply and are admitted to a degree program may apply these academic credits toward the requirements for either a Master of Public Health (MPH) or Master of Science (SM) degree. Two degree programs specifically designed for students in this field are the MPH with a concentration in Clinical Effectiveness (see page 10) and the SM in Epidemiology with a focus on Clinical Epidemiology (see page 39). Qualified participants unable to attend class during the regular academic year may fulfill requirements for the SM in Epidemiology or the MPH degree program by attending classes during a second or a third summer period and by completing a supervised research project.

English for Professional Communication

August 23-September 3, 1999

The teaching style of American classrooms is highly interactive and requires proficiency in spoken English. Students are expected to ask questions in class and to respond quickly in classroom discussions.

A two-week course for non-native English-speaking students entering HSPH is offered for six hours each day for two weeks. Students practice their English language skills by listening to and discussing material with public health content. The course focuses on understanding and responding to rapidly spoken English, giving individual and group presentations, responding to questions, offering a point of view in discussions, and writing academic papers. Writing skills will be evaluated, and small-group and individual instruction will be provided. This course is strongly recommended for students without previous experience in a US classroom. The program is also valuable for all students who wish to strengthen their spoken and written English and to gain experience participating in small-group discussions.

The tuition for the English for Professional Communication Program is $775.

Strategies for Success: An Orientation Program for New Students

September 7-17, 1999

The Stategies for Success program presents an opportunity for new students to orient themselves to HSPH and to Boston. It provides a brief, intensive introduction to the academic aspects of study at the school, including beginning and intermediate computing, exercises in the discussion method of classroom learning, and a review of mathematical and writing skills. Program participants learn about classroom protocol, expectations of teacher and student, and student life at the school.

The program is particularly valuable for those students who have not attended US colleges or universities and for those who have not recently been students. All international students are strongly advised to attend; US students are welcome and encouraged to attend. Please note that while the first week of the program is optional, the second week is mandatory for all new students.

For more information about the Summer Session for Public Health Studies, please contact Hildi Keary, Administrative Assistant for Summer Programs, Registrar's and Admissions Offices, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1052
Fax: 617-432-2009
E-mail: hkeary@hsph.harvard.edu (specify Summer Session on subject line)
www: www.hsph.harvard.edu/summer/brochure

For more information about the summer MPH degree program, please contact Roberta Gianfortoni, Director for Professional Education, Office for Professional Education, 677 Huntington Avenue, Boston MA 02115.
Phone: 617-432-0090
Fax: 617-432-3365
E-mail: rgianfor@hsph.harvard.edu

For information about the Program in Clinical Effectiveness, or to request application materials, please contact Barbara Rosen, Division of General Medicine, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115.
Phone: 617-732-5648
Fax: 617-732-5344
E-mail: brosen@bics.bwh.harvard.edu

For more information about the English for Professional Communication Program or the Strategies for Success program, please contact Laurel Landers, Program Coordinator, Office for Professional Education, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-0091
Fax: 617-432-3365
E-mail: llanders@hsph.harvard.edu
www: www.hsph.harvard.edu/mph/epc
www.hsph.harvard.edu/asp

1999-2000
Courses offered by the Center for Continuing Professional Education include:

Advanced Program in Health Care Negotiation and Conflict

Analyzing Risk: Science, Assessment, and Management

Atmospheric Science and Radioactivity Releases

Atmospheric Science and Risk Projections for Hazardous and Radioactive Materials Release

Assessment and Control of Occupational Hazards in Waste Site Remediation

Basic CAMEO/Windows Training

Benefit-Cost Analysis for Environmental, Health, and Safety Regulation

Certification Review for Occupational Health Nurses

Certified Safety Professional Review

Comprehensive Industrial Hygiene Review

Cost-Effectiveness Analysis for Medical Technologies and Pharmaceuticals

Ergonomic Guidelines for Computer Use

Fifth Harvard Conference on Strategic Alliances in Health Care

Fundamentals of Industrial Hygiene

Guidelines for Laboratory Design: Health and Safety Considerations

Hands-On Measurement and Diagnostics: Evaluating the Indoor Environment

In-Place Filter Testing Workshop

Industrial Ergonomics: Human Factors in Occupational Health and Safety

Leadership Development for Physicians in Academic Health Centers

Leadership in Evolving Health Care Systems

Leadership and Management Skills Essential for Health and Safety Professionals

Managing Ambulatory Health Care for Physicians in Community Health Centers

Management and Disposal of Radioactive Waste

Measurement, Design, and Analysis for Health Outcomes Research

Negotiation and Conflict Resolution

Nuclear Emergency Planning

Occupational and Environmental Radiation Protection

Occupational Health Physical Assessment Skills for Nurses

Orientation to Indoor Air Quality

Program for Chiefs of Clinical Services

Radioactivity in the Environment: Risk, Assessment, and Measurement

Resolution; Facilitating Integration of the Work of Multiple Contributors

Risk Management and Liability Issues in Occupational Safety and Health

Spirometry Testing in the Workplace

Testing and Certification of Biological Safety Cabinets

For a brochure and a complete list of continuing professional education courses, please contact the Center for Continuing Professional Education, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1171
Fax: 617-432-1969
E-mail: contedu@hsph.harvard.edu

Center for Continuing Professional Education

Executive Director: David A. Shore, MPA, PhD, Assistant Dean for Continuing Professional Education and PricewaterhouseCoopers Director of the Center for Continuing Professional Education

Organizations and technology evolve so rapidly that health professionals must continually gain new skills and perspectives. The Center for Continuing Professional Education (CCPE) creates programs to address the issues facing health professionals. Grounded in the Harvard tradition of innovative research and practice, these programs benefit participants wishing to assume and advance in positions of leadership in all fields of public health. Through a variety of formats and forums, including teleconferences and courses customized for and located at various organizations, CCPE provides learning opportunities that keep pace with and anticipate the needs of public health practitioners.

Harvard faculty members lead the programs in cooperation with other experts who have earned international reputations for excellence in their fields. Participants benefit from a wide and diverse body of knowledge. Through the exchange of insights and ideas between participants and instructors, programs encourage and create a dynamic learning environment. Many sessions use the Harvard case study method of instruction to facilitate fast-paced, interactive problem solving, while others include hands-on laboratory sessions and demonstrations with field equipment.

To increase the value to participants, programs offer continuing medical education credit and other forms of continuing professional education credit in areas of industrial hygiene and health care licensing and credentialing. Each participant receives a certificate of attendance.

A partial list of continuing professional education courses offered during the 1999-2000 academic year appears above.

Admission to Degree Programs

The admissions information in this section pertains to applications for degree programs offered by the Harvard School of Public Health. These are the Master of Public Health (MPH), Master of Occupational Health (MOH), Master of Science (SM), Doctor of Public Health (DPH), and Doctor of Science (SD) degrees.

The PhD programs described in this *Register* are offered under the auspices of the Graduate School of Arts and Sciences (GSAS). Please note that GSAS application forms and procedures are different from those used by applicants to programs administered by HSPH. The GSAS application deadlines are December 15, 1999, for programs in the natural sciences and December 30, 1999, for all other programs. For information about admission to the Biological Sciences in Public Health Program, please contact the Admissions Office, GSAS, Harvard University, Byerly Hall, 8 Garden Street, Cambridge, MA 02138 (phone: 617-495-5315). For information about admission to the PhD Program in Health Policy, please contact Joan P. Curhan, Director, 79 John F. Kennedy Street, Cambridge, MA 02138 (phone: 617-496-5412). (See page 12 for further information about PhD programs in the biological sciences and page 54 for information about the PhD in health policy.)

Application Deadline Applications for all HSPH doctoral (SD and DPH) and Master of Science (SM) programs must be complete by January 3, 2000. Applicants to the MPH or MOH degree with a specialty in the Occupational and Environmental Medicine Residency Program must apply by September 1, 1999.

All complete applications for the MPH and MOH programs that are received on or before January 3, 2000, will be considered in a priority admission cycle. The deadline for completing applications to MPH and MOH programs for review in a second cycle is February 28, 2000. It is to the candidate's advantage to meet the priority deadline, as these degree programs may fill to capacity during the priority MPH admission cycle. Applications that arrive after February 28, 2000, and those that remain incomplete as of that date, will not be considered for admission for the 2000-2001 academic year.

Please refer to the instruction booklet that accompanies the application forms for detailed procedures and requirements. Prospective degree candidates or special students who wish to request application materials, who have questions about admission requirements, who require assistance with the application process, or who wish to visit the school should contact Margaret Watson, Assistant Director of Admissions, HSPH Admissions Office, 677 Huntington Avenue, Boston, MA 02115
Phone: 617-432-1031
Fax: 617-432-2009
E-mail: admisofc@hsph.harvard.edu

It is the policy of HSPH to make admission decisions on the basis of an individual's qualifications for the program to which he or she has applied. In decisions about admission and financial aid, HSPH does not discriminate against individuals on the basis of race, color, sex, sexual orientation, religion, age, national or ethnic origin, political beliefs, veteran status, or disability.

Clinical Effectiveness and Summer Session affiliates matriculating in the 2000 summer program who wish to apply for degree candidacy are strongly encouraged to meet application deadlines outlined above. At the time this *Register* went to press, there were provisions for summer program participants to apply for admission to degree programs in the fall, immediately after completing their summer program, with a deadline of September 1, 2000. The Committee on Admissions and Degrees is considering eliminating this admissions cycle. However, interested applicants should contact the Admissions Office for more information.

Application Procedures and Requirements
Only complete applications will be processed and reviewed for admission. For an application to be considered complete, the Admissions Office must receive the following application materials by the deadline indicated above:

• A completed and signed application form, a self-addressed, stamped notification postcard, and a 500-word essay written by the applicant. This essay should describe the applicant's academic and professional history, area of interest at HSPH, reasons for wanting to enroll in the degree program, and professional or academic career plans upon completion of the program.

• Official transcripts from all colleges, graduate schools, and/or professional schools attended, whether or not the courses taken appear to be relevant to a degree in public health. Transcripts should list courses taken, grades received, and degree(s) conferred (if applicable). Each transcript must be received by the Admissions Office in an envelope sealed and signed by the registrar of the school issuing the transcript. Applicants are expected to have a distinguished undergraduate record, as well as excellent performance in any graduate work undertaken.

• Letters of recommendation from at least three people who are well acquainted with the applicant's academic work and/or professional experience. (Recommendation forms are provided in the application packet.)

• Official scores of the Graduate Record Examination (GRE). Applications will not be considered without test score reports. Applicants should take the GRE early enough so that score reports will be submitted by the application deadline. Although applicants are strongly recommended to submit GRE scores, the following substitutions may be permitted in the specified circumstances: physicians and currently enrolled medical students may submit Medical College Admission Test (MCAT) scores; dentists and dental students may submit Dental Admissions Test (DAT) scores; lawyers and law school students may submit Law School Admission Test (LSAT) scores; and those who hold or who are earning an MBA or DBA from an accredited institution may submit Graduate Management Admission Test (GMAT) scores. Applicants who propose to substitute one of these tests for the GRE must contact the Admissions Office for a determination of appropriateness of substitution. The requirement for scores from a standardized test will not be waived on the basis of academic or professional background.

• Official scores of the Test of English as a Foreign Language (TOEFL), if applicable. Applicants (including those who have been US citizens or US permanent residents for less than one year) from countries where English is not the language of instruction must submit a score from the TOEFL. Applicants are advised to take the TOEFL early enough so that score reports are submitted by the application deadline; those who have already taken the TOEFL may submit the score as long as it is not more than two years old. While a minimum score of 560 on the paper-based test or 220 on the computer-based test is required for admission to a degree program, preference is given to applicants with scores closer to 600 on the paper-based test and 250 on the computer-based test, due to the demanding nature of the program. Applicants who receive a score of 557-560 on the

Tuition and Fees, July 1999-June 2000

Tuition for full-time master's degree students and special students	
(20-credit minimum and 22.5-credit maximum per semester, fall and spring.)	$22,950 per year
Tuition for part-time master's degree students, special students, and affiliates	
(1-19 credits per semester, fall and spring, with a maximum of 15 summer credits. Part-time students may take 45 credits per year for the comparable full-time tuition rate.)	$ 574 per credit
Tuition for full-time resident doctoral students	
(20-credit minimum and 22.5-credit maximum per semester, fall and spring.)	
Full-time, year 1	$22,950 per year
Full-time, year 2	$22,950 per year
Full-time reduced, year 3	$11,475 per year
Facilities fee, year 4 to thesis defense	$ 2,868 per year
Thesis defense fee (final semester before graduation)	$ 1,226 one semester
Tuition for part-time resident doctoral students	
Credits 1-80	$ 574 per credit
Credits 81-120	$ 287 per credit
Credits 121 to thesis defense	$ 72 per credit
Thesis defense fee (final semester before graduation)	$ 1,226 one semester
Tuition for nonresident doctoral students, full-time or part-time	$ 1,536 per year
Tuition for summer session 1999	$ 574 per credit
Fees	
Registration fee (summer, fall, spring)	$ 125 per semester
Late registration fee	$ 80
Late add/drop/change fee	$ 80 per petition
Leave of absence fee	$ 300 per semester
Health fees (see page 89)	$ 356 per semester

Note: Tuition rates are given in 1999-2000 tuition dollars. Continuing students should expect an increase.

paper-based test may be reviewed for special student status for one term. (The equivalent score on the computer-based test is 220.) Once enrolled, students may petition to be reconsidered for admission to degree candidacy if they retake the TOEFL, and earn a 560 or higher before October of the year they enter the school.

• A non-refundable application fee of US $60 in the form of a check drawn on a bank in the United States, a postal money order, or an international money order payable to the Harvard School of Public Health.

An applicant may apply to only one degree program (MPH, MOH, SM, SD, or DPH). An applicant who wishes to apply for a joint degree in two departments should submit a petition requesting consideration by both departments. Requirements for admission to both departments must be satisfied. Applicants to degree programs must apply for either full-time or part-time status; international students applying for an F1 visa are eligible for full-time study only. Admission is granted for the fall semester of a particular year (currently September 2000). Students who are unable to enroll at that time may

Housing

The Henry Lee Shattuck International House is operated by the school on a nonprofit basis for its full-time students and their families from the United States and abroad. Located in Boston's Fenway area within a ten-minute walking distance of the school, this newly renovated apartment complex consists of two buildings with 73 furnished apartments of various sizes to accommodate single students, roommates, and families. A few apartments are wheelchair accessible. All apartments have a private kitchenette and bath, free internet and email access via a data link to the school, two telephone lines, and interior cable access. Shared facilities include a computer room with fax and copy machines, a library, an exercise room, function rooms, a children's playroom, a laundry room, an indoor bicycle storage area, and a playground.

Apartments are assigned to eligible applicants in accordance with the following guidelines: 1) new HSPH students are given priority; 2) generally, seventy percent of the available apartments are reserved for international students, and thirty percent are rented to US and Canadian students, with priority given to those coming from outside the New England and surrounding areas; 3) within these categories, applications are considered on a first-come, first-served basis. A waiting list will be maintained throughout the summer and fall for applicants who are not assigned an apartment during the initial process.

Demand for the apartments exceeds their availability. It is to the applicant's advantage to submit a housing application before he or she receives notification of admission to the school. Apartments are assigned after applicants are admitted and have confirmed their intention to enroll. If an applicant is denied admission to the school, the application for housing will be withdrawn. The maximum length of residency is two years, assuming

request a deferral and may be required to reapply. Applicants who require an early decision should adhere to the application deadlines for the year before the one in which they wish to enroll (for example, they may apply during the winter of 1999-2000 for admission in September 2001).

Application Review Applicants are notified by postcard when the application is received. Applicants are notified in writing of their application status soon after the application is processed. It is the responsibility of the applicant to ensure that the application is complete by the deadline. If the application is incomplete, the HSPH Admissions Office will attempt to inform the applicant of the items still outstanding. Applications to the MPH and MOH programs that become complete after January 3, 2000, will be held for review in a second group. The applicant is notified in writing as soon as a decision is made. The decision of the Committee on Admissions and Degrees is final and is not subject to appeal.

Tuition Deposit and Financial Certification Applicants who are granted admission must submit a $500 tuition deposit when confirming acceptance of the offer of admission. This deposit is nonrefundable and will be applied toward the student's tuition and fees.

Accepted applicants who are not US citizens or permanent residents must demonstrate that sufficient funds are available in US currency to pay the costs (tuition, fees, living expenses, and costs associated with the English for Professional Communication Program, if applicable) of the full period of their academic program. A financial certification form is included in the admission packet for this purpose and must be completed before the certificate of eligibility form (I-20 or IAP-66) needed to obtain a visa can be issued. In addition, international students supported by personal funds, family funds, or sponsors' funds which are not paid directly to Harvard University are required to deposit and retain, in a Boston-area bank in an account bearing their name, funds adequate to cover the appropriate tuition, fees, and living expenses for the degree program. An official letter stating the amount held in US dollars must be sent directly by the bank to the Admissions Office for each account before the immigration forms can be completed. Students bringing their families to the US must

Health Fees, September 1999-August 2000

University Health Services (UHS) Fee	Semester	Year
Individual	$ 356	$ 711
Family (student plus spouse)	729	1,458
Family (student plus spouse and one child)	936	1,871

The University Health Services (UHS) provide comprehensive prepaid medical care such as physical examinations, physician visits, laboratory tests, psychological counseling, and emergency services. The UHS fee is compulsory for all degree candidates and special students registered for 10 or more credits in a semester. Others may elect to waive UHS coverage; this must be done before the first day of fall registration.

Blue Cross/Blue Shield (BC/BS) Medical Insurance	Semester	Year
Individual	$ 280	$ 560
Family (student plus spouse)	832	1,663
Family (student plus spouse and one child)	1,251	2,501

The Blue Cross/Blue Shield (BC/BS) plan provides extensive benefits for ambulatory and inpatient care not offered at UHS. BC/BS coverage is compulsory for all nonimmigrant international students and for all other students who do not have comparable insurance. International students whose spouse and/or children will also be living in the US are required to enroll in the family plan. US students who have comparable insurance may elect to waive BC/BS coverage; this must be done before the first day of fall registration.

Note: UHS and BC/BS coverage extends from September 1 through August 31. For more information, please contact the Student Insurance Office, Harvard University Health Services, 75 Mt. Auburn Street, Cambridge, MA 02138 (phone: 617-495-2008; fax: 617-496-6125).

transfer and certify adequate funds for their support as well. (Please see page 90 for an estimate of living expenses in the Boston area.)

Admission to Nondegree Status

Affiliates Harvard faculty and staff, employees of Harvard-affiliated hospitals, HSPH alumni, and certain other Boston-area public health professionals may register for a maximum of 10 credits per semester as nondegree affiliates of the school. Affiliates must register in person at the HSPH Registrar's Office. Please call the Registrar's Office at 617-432-1032 to learn the exact dates for affiliate registration.

Enrollment of affiliate students in specific courses is subject to the availability of space and permission of the instructor and the Registrar; if classes fill to capacity, preference is given to HSPH degree candidates. Payment is on a per-credit basis and is due at the time of registration. Payment is not refundable unless the student is unable to take the desired course because it is filled to capacity. Affiliate students may not cross-register into other Harvard schools or MIT, nor may they audit courses.

Special Students Individuals who do not fall into one of the categories listed above may apply for special student status. Applicants for special student status are subject to the same admission and registration requirements, deadlines, and procedures as are applicants for degree candidacy. US citizens and permanent residents may apply to the Admissions Office for full-time or part-time special student status. Foreign applicants are eligible for full-time status only. Admission to special student status is limited to one academic year. The deadline for applying for special student status is January 3, 2000.

residents maintain the status of full-time students. A partial year of residency counts as an entire year.

Applicants visiting HSPH are welcome to visit the Office for Students and take advantage of available resources. Carol LaFleur, Student Services Coordinator, is available to discuss housing options and answer questions, preferably by advance appointment.

For information about housing and to request application forms for Shattuck International House, please return the postcard inside the back cover of this Register, or contact Carol LaFleur, Student Services Coordinator, HSPH Office for Students, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1034
Fax: 617-432-3184
www: www.hsph.harvard.edu/housing/

For information about admission to affiliate status, please contact the HSPH Registrar's Office, 677 Huntington Avenue, Boston, MA 02115
Phone: 617-432-1032
Fax: 617-432-2009
E-mail: registra@hsph.harvard.edu

Estimated Student Expense Budgets, 1999-2000

	US Citizens/ Permanent Residents		Non-US Citizens		US Citizens/ Permanent Residents		Non-US Citizens		US Citizens/ Permanent Residents		Non-US Citizens	
	Individual 9 Mos.	Individual 12 Mos.	Individual 9 Mos.	Individual 12 Mos.	Family of 2 9 Mos.	Family of 2 12 Mos.	Family of 2 9 Mos.	Family of 2 12 Mos.	Family of 3 9 Mos.	Family of 3 12 Mos.	Family of 3 9 Mos.	Family of 3 12 Mos.
Full-time resident tuition	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950	$22,950
UHS fee	711	711	711	711	1,458	1,458	1,458	1,458	1,871	1,871	1,871	1,871
BC/BS insurance	560	560	560	560	1,663	1,663	1,663	1,663	2,501	2,501	2,501	2,501
Registration fee	250	250	250	250	250	250	250	250	250	250	250	250
Books/supplies	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Loan fees	740	740	N/A	N/A	740	740	N/A	N/A	800	800	N/A	N/A
Rent/utilities	8,100	10,800	8,100	10,800	8,910	11,880	8,910	11,880	9,720	12,960	9,720	12,960
Food	2,534	3,384	2,534	3,384	3,801	5,064	3,801	5,064	4,561	6,084	4,561	6,084
Personal	2,799	3,732	2,799	3,732	4,031	5,376	4,031	5,364	4,479	5,964	4,479	5,964
Local transportation	470	630	470	630	713	794	713	794	713	794	713	794
Total	$40,314	$44,957	$39,574	$44,217	$45,716	$51,375	$44,976	$50,623	$48,985	$55,314	$48,245	$55,574

Please refer to the instruction booklet that accompanies the financial aid application forms for additional information about loan and work programs. Applicants with questions should contact the HSPH Financial Aid Office, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1867
E-mail: hsphfao@hsph.harvard.edu

Subsequent Application for Degree Candidacy Affiliates and special students who wish to be admitted to degree candidacy must apply and will be considered on the same basis as other applicants for admission. Applicants to degree programs who have taken courses at the school within the preceding three years may, at the time of their application, petition to count up to 20 credits retroactively as part of the academic credit requirements. Permission may be granted if the courses fit into the applicant's academic degree program. (Applicants who have taken HSPH courses within the past three years while enrolled at another Harvard school or at MIT may petition to count up to 20 credits toward their HSPH degree only if the courses taken did not count toward another degree. The applicant must submit, at the time of his or her application, an official transcript from the other school, as well as a letter from that school's registrar stating that the courses taken at HSPH have not been counted toward another degree.) Up to 20 credits of tuition paid to HSPH may be counted toward the school's tuition requirement. If an applicant is successful in petitioning to have credits taken at HSPH as a cross-registrant from another school transferred to his or her HSPH degree program, then tuition for those credits must be paid to HSPH.

Financial Aid

The table above provides estimates of the cost of spending a year at HSPH and should be used as a guide in planning finances. While academic departments and the Financial Aid Office make every effort to help students find ways to finance their education at HSPH, the school does not offer need-based grants, and resources for student financial aid are extremely limited. Applicants are urged to investigate all potential sources of support, including employers, government agencies, and civic and religious organizations.

Limited financial aid is available in the form of grants, loans, and work programs, as follows:

Grants Some departments have training grants that provide funds up to full tuition plus stipend. Eligibility for training grants is generally based on career goals, academic merit, experience, and US citizenship or permanent residency. Other grants also may be available, eligibility for which varies according to departmental goals and priorities. All incoming students are considered for these funds; in some instances a separate application must be submitted. Please contact the appropriate department for clarification.

Federal Student Loans The Financial Aid Office administers several federal Title IV student loan programs. US citizens and permanent residents may be eligible to borrow up to $18,500 of Federal Direct Student Loans if they meet the registration status requirements, submit the required financial aid applications and documentation, have no prior federal student aid loans in default, and do not owe refunds on other federal student aid. Perkins Loans of up to $6,000 may be available to a limited number of students demonstrating extreme financial need.

Work Programs Some full-time students obtain part-time employment as research or teaching assistants in their academic departments. The school also participates in the Federal Work-Study Program, which covers between 50% and 75% of the earnings of US citizens and permanent residents.

To be considered for federal loans, work-study, and need-based grants, students must submit the following documents to the Financial Aid Office:

• Completed and processed Free Application for Federal Student Aid (FAFSA) for 2000-2001, or FAFSA on the web at www.fafsa.ed.gov. The HSPH school code is E00214. The toll-free number to request the FAFSA is 1-800-433-3243; the toll-free number for the hearing impaired is 1-800-730-8913. Allow 4-6 weeks processing time. The FAFSA cannot be submitted before January 1, 2000.

• The Student Aid Report (SAR) should be submitted after the candidate receives the report from the federal processor.

• Completed HSPH Request for Federal Assistance Form for 2000-2001. This form should be submitted to the Financial Aid Office by February 12, 2000.

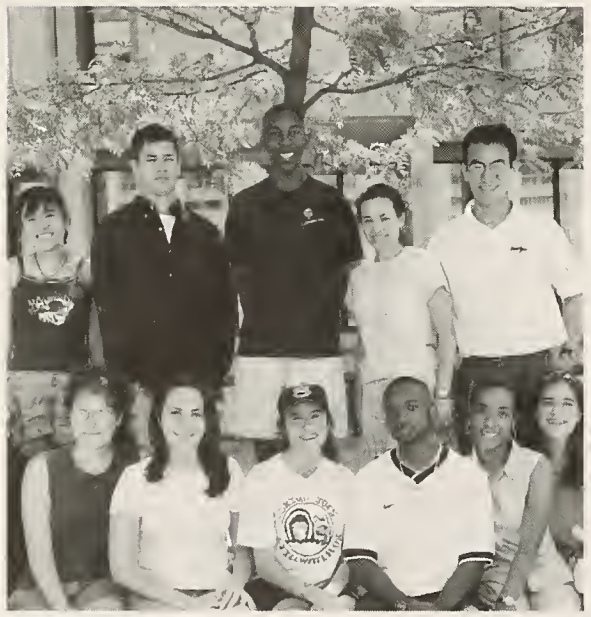
• Signed copy of the applicant's 1999 Federal Income Tax Return, with schedules, or a Non-Filer Statement, and the corresponding W-2 form(s).

• For permanent residents, a copy of the front and back of the Alien Registration Card.

• For US citizen and permanent resident males born after January 1, 1962, who are not registered with Selective Service, a statement from Selective Service indicating that they did not willfully fail to register. This statement can be obtained by writing to the Selective Service System, Office of the General Counsel, Washington, DC 20435.

• The Financial Aid Office may request other items upon review of the initial application.

• Staff in the Financial Aid Office review completed financial aid applications as soon as they have been notified by the Admissions Office that the applicant has been admitted to the school and they have confirmed any departmental grant offers. An aid letter is then sent to the applicant. Students must disclose to the Financial Aid Office, in writing, any outside funding award(s).



Registration

Prior to registration, students receive complete course descriptions and information about course meeting times and registration procedures. Every resident degree candidate is expected to register in person on the dates specified. The fall 1999 registration dates for degree students are September 13 and 14. A student who is unable to register at the designated time should write to the Registrar's Office to request late registration and will be assessed a late registration fee of $80 per week.

Students who intend to cross-register for courses in other Harvard schools or at MIT should be aware that registration deadlines and academic calendars vary from school to school and that they must conform to the registration requirements of the school into which they are cross-registering as well as those of HSPH.

In order to register, students must show that they have met any contingencies stated in their letter of admission; that they have complied with the Massachusetts state regulation concerning immunization against measles, mumps, and rubella; and, for international students, that they have presented their passports and entry permits to the Harvard International Office. Students must take appropriate action to pay their semester term bill by the due date of the bill on which the charges appear. Information about each of these prerequisites is sent to incoming students prior to their arrival at the school.

Degree candidates are subject to certain course load and tuition requirements. All degree candidates (with the exception of students on leave of absence) are expected to register each semester. To be considered full-time, students must take 40 to 45 credits during the nine-month academic year (September to May), with a minimum of 20 credits per semester. Part-time students enroll in fewer than 20 credits in a semester.

Degree candidates are required to pay full-time or equivalent tuition to the Harvard School of Public Health for a designated number of credits, depending on the length of their program (for example, a student in the MPH program must pay tuition for a minimum of 40

credits in order to receive the degree). Doctoral students who earned an HSPH master's degree within three years of beginning the doctoral program are credited with tuition paid during their master's program. The *Student Handbook,* distributed at registration, provides detailed information about course load and tuition requirements for degree programs. Tuition paid for enrollment at any other Harvard school or program does not count toward the HSPH residency requirement.

Incoming full-time degree candidates and special students receive a bill for fall semester tuition and fees in July and on a monthly basis thereafter. (Students matriculating as degree candidates during the summer receive a bill in May for summer tuition.)

Spring semester tuition and fees are charged to the student's bill in December. Part-time tuition is assessed in July for fall semester and in December for spring semester at 10 credits. Part-time students wishing to register for fewer than 10 credits should inform the Registrar's Office prior to registration so the bill can be reduced accordingly. Students wishing to complete more than 10 (and fewer than 20) credits should inform the Registrar's Office prior to registration so the 10-credit registration cap can be lifted and the bill can be adjusted accordingly. In the case that the Registrar's Office is not notified of a part-time student's registration intentions, payment of 10 credits is required prior to registration, and the student is limited to 10 credits until the Registrar's Office is notified otherwise.

To be eligible for Federal Student Loans, part-time students must register for 10 or more credits. To be eligible to waive the University Health Services fee, students must register for 10 or fewer credits.

Students who are sponsored by a non-Harvard funding agency (for example, the World Health Organization or the US military) must provide an original award letter from the sponsoring agency outlining the US dollar amount awarded, the terms of payment for each year the student will be funded, and the duration of the sponsorship. While the sponsor is billed directly at mid-semester, all charges and credits appear on the student's monthly term bill. Sponsored-billing forms are available from the Registrar's Office.

Harvard faculty and staff, Harvard alumni, affiliates (except those in summer programs), and Boston-area public health professionals enrolled in non-degree status do not receive a term bill, but must pay all tuition and fees in full when they register. Payment is not refundable if the student elects to drop the course(s) for which he or she has registered.

In addition to tuition and fees, other charges that may appear on the term bill include course materials charges, library fines, any charges not covered by the University Health Services fee (for example, some dental and optical shop charges), and rental charges from Harvard Real Estate.

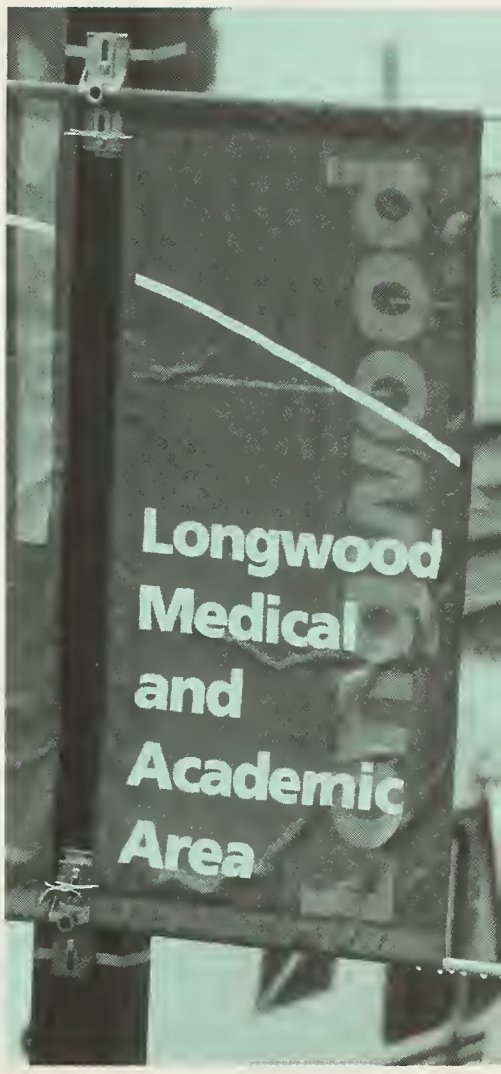
Student Support Services

The Office for Students provides support services and offers educational, social, and cultural programs that enhance the academic experience, facilitate student development, encourage interaction among students, and help students to cope with the many demands of their academic and personal lives. Responsibilities of the Office for Students include maintaining a liaison with the student government and other student groups, and addressing particular needs and concerns of students, both individually and through special programming. The provision of career services, administration of the school's residential facilities, and assistance to students with disabilities are encompassed within the Office for Students.

Student Organizations

The Student Coordinating Committee (SCC) includes elected representatives from each department, from the Master of Public Health program, and from the Division of Biological Sciences. The SCC meets regularly to discuss issues and plan activities related to student life at HSPH and provides a mecha-

For information about registration and billing procedures, please contact the HSPH Registrar's Office, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1032
Fax: 617-432-2009
E-mail: manthony@hsph.harvard.edu



For information about services provided by the Office for Students or about student organizations and activities, please contact Robin M. Worth, Assistant Dean for Students, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1036
Fax: 617-432-3184

For information about minority student recruiting, please contact the HSPH Admissions Office, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-1030
Fax: 617-432-2009
E-mail: manthony@sph.harvard.edu

For information about services offered by the Harvard University International Office, please contact the Advisor to Foreign Students and Scholars, Harvard International office, 1350 Massachusetts Avenue, Cambridge, MA 02138.
Phone: 617-495-2789
Fax: 617-495-4088

nism for working with members of the school's faculty and administration on school-wide issues, for sponsoring seminars and other educational programs, for organizing social activities, and for arranging for student representation on several of the school's faculty committees. The SCC frequently sponsors or cosponsors collaborative activities with the school and the neighboring community, including tutoring programs, toy drives, and an annual dinner-dance for senior citizens.

Other student organizations include the Health and Human Rights Committee, Ñ-The Spanish Speaking Committee, Minority Student Health Organization, Asian Club, Women in Public Health, Students of the African Diaspora, the Longwood Players, and the Lesbian, Gay, Bisexual, and Transgender Alliance.

Minority Students

The increased participation of underrepresented groups in public health practice and research is essential to the advancement of health, and the school is committed to expanding the diversity of its faculty, staff, and student body. Members of US minority groups are urged to identify themselves for special recruitment efforts by the Admissions Office.

The HSPH Minority Student Health Organization (MSHO) plays a leading role in presenting programs on public health issues concerning underserved populations. Ñ-The Spanish Speaking Committee takes up issues of importance to that constituency. The Asian Club promotes both cultural activities at HSPH and Asian student involvement in the community. Students of the African Diaspora, the school's newest organization, represents the interests of black students at HSPH.

The Third World Caucus (TWC) brings together minority students from throughout Harvard's Longwood campus, which includes the medical, dental, and public health schools. TWC comprises several organizations, including the Black Health Organization, Medical Students of Las Americas, Meeting of Students Addressing Intercultural Concerns (MOSAIC), Native American Health Organization, Student National Medical Association, and Student National Dental Association.

International Students

During the 1998-99 academic year, approximately 24 percent of HSPH students came from outside the United States, representing 54 countries. The experience international students bring to the school lends an important dimension to the academic program and adds to the diversity of the student population. International students organize many cultural events at the school, such as celebrations of the lunar New Year, and participate in the annual International Night talent show.

The Office for Students assists foreign students in adjusting to life in the United States. The office sponsors ESL classes, hosts the Global Chat (a weekly lunchtime meeting that gives students an opportunity to practice their English while learning about each

other's native country), and organizes social events and local excursions. Staff in the Office for Students are available to meet with students to discuss personal or academic problems and to assist students and their families who have questions about living in Boston and the United States.

The Harvard International Office, located on the Cambridge campus, provides a variety of services to students from abroad, including orientations, newsletters, and cross-cultural workshops. One program, the Friends of International Students, matches students with a person or family who will welcome them and ease their transition to the US. Foreign student advisors from the Harvard International Office holds weekly office hours at HSPH to assist students with visa matters and to advise them on immigration regulations.

Child Care Facilities

There are a number of child care facilities available to students on the Longwood and Cambridge campuses. Arrangements should be made as early as possible, as facilities are quickly filled. For further information about these centers and other child care options in the area, please contact the Office of the Child Care Advisor at 617-495-2851. The Medical Center Office for Parenting at 617-432-1615 can also provide information on support services, resources, and programs.

Career Services

The Career Services Office provides career counseling, employment resources, and networking opportunities to assist students and alumni in expanding their employment prospects. The office sponsors workshops on job-seeking strategies, interviewing skills, and resume and cover-letter writing, and panel discussions featuring public health professionals speaking about market trends and career paths. In the Career Resource Center, students have access to listings of current job openings, information about fellowships and internships, and resource directories. The office also maintains a website, which provides links to additional career and employment resources.

For more information about career services, please contact the Director of Career Services, Office for Students, 677 Huntington Avenue, Boston, MA 02115.
Phone: 617-432-2401
Fax: 617-432-3184
www: www.hsph.harvard.edu/Admins/offstuds/career.html

Alumni Association

The Alumni Association of the Harvard School of Public Health enjoys an active membership of over 6,000 graduates worldwide. The association is governed by an elected council of twelve members who meet four times each year. Regional gatherings of alumni are often organized in the United States and abroad by members of the association with assistance from the HSPH Office of Alumni Relations. Members of the association are also active in raising funds for student scholarships and travel grants.

HSPH graduates and current students are available to potential applicants to answer questions about departments, curricula, career opportunities, and alumni activities. For referrals to graduates or current students, contact Maria Anthony, Registrar and Assistant Dean for Admissions and Financial Aid, at 617-432-1032.

For more information about alumni activities, please contact Holly Kent, Director of Alumni Relations and Alumni Giving, HSPH Office of Development and Alumni Relations, 116 Huntington Avenue, Ninth Floor, Boston, MA 02116.
Phone: 617-351-0162
Fax: 617-351-0106
E-mail: alumni@hsph.harvard.edu

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ment of Education, J.W. McCormack POCH, Room 222, Post Office Square, Boston, MA 02109.

Disabilities

The university, in accordance with its obligations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, does not discriminate against qualified individuals with disabilities in admission or access to programs and activities. Carol LaFleur, HSPH coordinator for students with disabilities, assists all students with learning, manual, mobility, hearing, visual, and other disabilities. Testing is available, usually for a fee, for students who suspect they may have a learning disability.

Voter Registration

Massachusetts state law, as set forth in Chapter 51, Section 42E (Section 17 of Chapter 475 of the Acts of 1993), requires educational institutions to make available affidavits of voter registration. Eligible students may register to vote at registration, and mail-in registration affidavits are available from the Registrar's Office. Students from other states who desire to vote in a state other than Massachusetts may use the federal mail-in affidavit of voter registration or a mail-in form supplied by the state. These students must contact the appropriate state election official to receive the state form or may contact the Massachusetts Elections Division, Room 1705, McCormack Building, One Ashburton Place, Boston, MA 02108, for a federal form.

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A wealth of HSPH information can be accessed via the World Wide Web at www.hsph.harvard.edu. This website includes updated course, faculty, and educational information, and school news. Information about Harvard's other faculties can be found at www.harvard. edu.

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As a matter of policy, law, and commitment, the Harvard School of Public Health does not discriminate against any person on the basis of race, color, sex, sexual orientation, religion, age, national or ethnic origin, political beliefs, veteran status, or handicap in admission to, access to, treatment in, or employment in its programs and activities. The following person has been designated to handle inquiries about nondiscrimination programs: Carolyn Everette, Assistant Dean for Human Resources, 677 Huntington Avenue, Boston, MA 02115 (phone: 617-432-1046). Inquiries about the application of nondiscrimination policies concerning race, color, national origin, age, sex, or handicap may also be referred to the Regional Director, Office for Civil Rights, US Department of Education, J.W. McCormack POCH, Room 222, Post Office Square, Boston, MA 02109.

Disabilities

The university, in accordance with its obligations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, does not discriminate against qualified individuals with disabilities in admission or access to programs and activities. Carol LaFleur, HSPH coordinator for students with disabilities, assists all students with learning, manual, mobility, hearing, visual, and other disabilities. Testing is available, usually for a fee, for students who suspect they may have a learning disability.

Religious Holidays

According to Chapter 151c, Section 2B, of the General Laws of Massachusetts, any student in an educational or vocational training institution, other than a religious or denominational training institution, who is unable, because of his or her religious beliefs, to attend classes or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or requirement which he or she may have missed because of such absence on any particular day, provided that such makeup examination or work shall not create an unreasonable burden upon the school. No fees of any kind shall be charged by the institution for making such opportunity available to the student, and no adverse or prejudicial effects shall result to any student for availing himself or herself of these provisions.

Campus Security

In compliance with the Student Right-to-Know and Campus Security Act of 1990, the Harvard University Police Department publishes an annual security booklet entitled *Playing It Safe*. The booklet describes Harvard's security policies, provides statistical information on the occurrence of crime on campus, and outlines some of the counseling programs the university offers. You may obtain a copy of *Playing It Safe* from the HSPH Admissions Office, 677 Huntington Avenue, Boston, MA 02115 (phone: 617-432-1031).

Voter Registration

Massachusetts state law, as set forth in Chapter 51, Section 42E (Section 17 of Chapter 475 of the Acts of 1993), requires educational institutions to make available affidavits of voter registration. Eligible students may register to vote at registration, and mail-in registration affidavits are available from the Registrar's Office. Students from other states who desire to vote in a state other than Massachusetts may use the federal mail-in affidavit of voter registration or a mail-in form supplied by the state. These students must contact the appropriate state election official to receive the state form or may contact the Massachusetts Elections Division, Room 1705, McCormack Building, One Ashburton Place, Boston, MA 02108, for a federal form.

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On-Line Resources

A wealth of HSPH information can be accessed via the World Wide Web at www.hsph.harvard.edu. This website includes updated course, faculty, and educational information, and school news. Information about Harvard's other faculties can be found at www.harvard. edu.

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